Service Manual

TOP NEXT

MTNC040314C1

B19 Canada:B05

Service Manual

Color Television

- CT-32HC14J
  CT-32HC14UJ

DX4M

© 2004 Matsushita Electric Corporation of America. All rights reserved. Unauthorized copying and distribution is a violation of law.

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic®

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

SCHEMA99

TOP NEXT

http://schema99.host.sk/

8 Auto diagnosis feature

TOP PREVIOUS NEXT

This receiver incorporates a new self diagnosis feature. With this new feature will be easier for the technician to detect the failures. There is a LED located by the keyboard on the front panel, this LED will start flashing when a failure is detectedby the circuits located in specific areas, depending on how many times the LED is flashing, this will tell you what circuit should be checked. Make a count of flashing and see the table shown below. Please use this feature effectively especially forintermittent problems.

SOS of front LED

FLASHES	POSSIBLE CIRCUIT	SOS
1	POWER+140	SOS 1
2	LOW B+ D.C.	SOS 2
4	HI VOLTAGE HHS	HHS
5	IC4511	GC2M
6	IC4518	GC2S
8	AUDIO AMP	SOS 4

AFTER THE COUNT

Proceed to check that area, verify what board is the problem located, this way the area to check will be reduced until the failure is found.

TOP PREVIOUS NEXT

SCHEMA 99

http://schema99.host.sk/

9 EEPROM copy jig

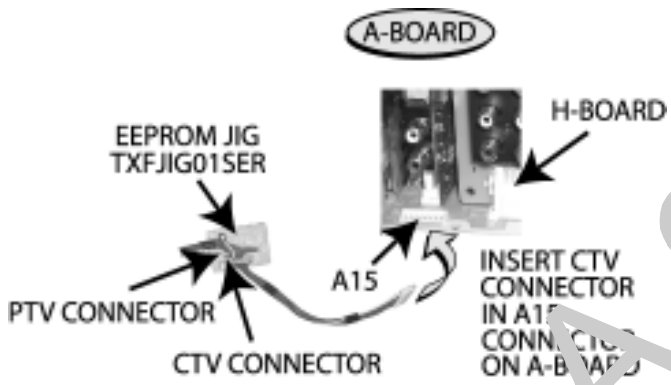
TOP PREVIOUS NEXT

This CTV has a feature that allows to clone or back-up main EEPROM data adjustments from a CTV to other by connecting a jig to the CTV set. A jig part number TXFJIG01SER, is available through Matsushita/Panasonic Services.

Preparation:

To connect this jig, remove the lower back cover as instructed on disassembly for service section on this service manual and insert the jig into A15 connector located on the A-Board. (See figure)

EEPROM copy jig connection



Procedure to copy data:

1. Enter to service mode and display service menu.

2. Select “AREA” DAC and then press ACTION button on remote to enter. Press VOL right/left to select one of the following options then press ACTION:

   - Select ALL to copy all main EEPROM data
   - Select ADJ to copy only adjustment data.
   - Select FIX to copy only fix data

3. To copy data from main EEPROM to jig, select “IN→EX” DAC and press ACTION button on remote.

4. To copy data from jig to main EEPROM, select “EX→IN” DAC and press ACTION button on remote.

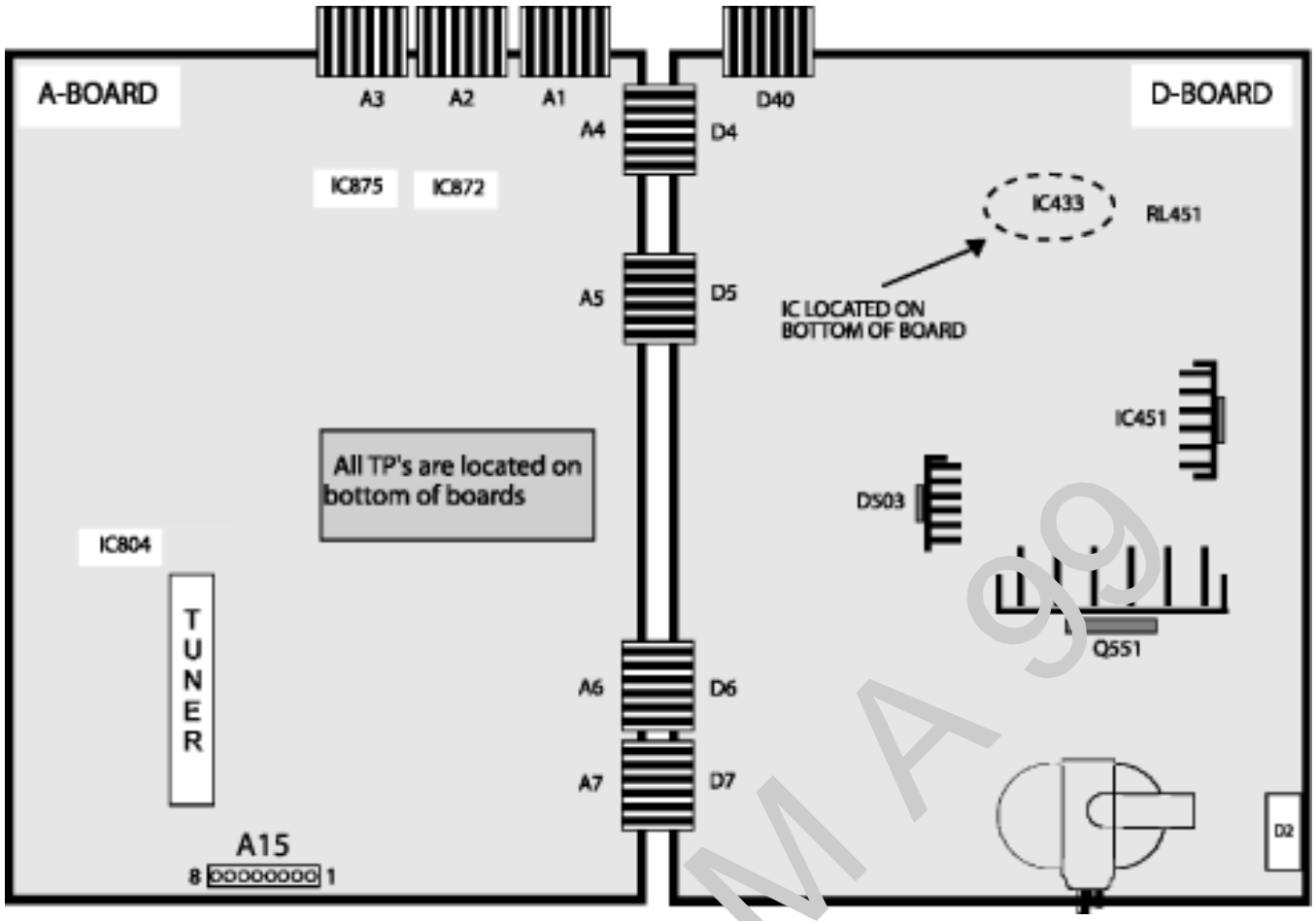
TOP PREVIOUS NEXT

SCHEMA 99

http://schema99.host.sk/

12 Chassis service adjustment procedures

All service adjustments are factory preset and should not require adjustment unless controls and/or associated components are replaced.



140.0_V B+ voltage check

1. Set the BRIGHT and PICTURE to minimum by using the PICTURE menu.
2. Connect the DVM on TPD144 (D-Board by D2 connector) and cold ground
3. Confirm that B+ voltage is 144.0V ± 1.5V. This voltage supplies B+ to the horizontal output and flyback circuits.

Source voltage chart

120V AC line input. Set the BRIGHT and the PICTURE to minimum by using the PICTURE menu. Use cold or hot ground for the (-) lead of the DVM as needed

A-BOARD	VOLTAGE
STBY 7V (BY IC804) A-Board TPP9	7.5 ± 0.6V
MAIN 9V (BY IC875) A-Board TPA7	9.0V ± 0.5V
MAIN 5V (BY IC871) A-Board TPA8	5.0V ± 0.3V
GC 2.5V (BY IC872) A-Board TPA9	2.5V ± 0.2
STBY 3.3V (BY A1 CONNECTOR) A-Board TPA16	3.3V ± 0.2V

D-BOARD	VOLTAGE
+B2 (BY D2 CONNECTOR) D-Board TPD144	144.0 ± 1.5V
25V (BY D40 CONNECTOR) D-Board TPD250	27.5 ± 2.0V
15V (BY D4 CONNECTOR) D-Board TPD150	15.7 ± 1.5V

SCHEMA99

http://schema99.host.sk/

-15V (BY RL451) D-Board TPD151	-16.0V ± 1.5V
SOUND+ (BY D4 CONNECTOR) D-Board TPD160	16.5V ± 1.0V
SOUND- (BY D4) D-Board TPD161	-16.5V ± 1.0V
220V (BY D2 CONNECTOR) D-Board TPD7	210V ± 5.0V
12V (BY IC433) D-Board TPA6	12V ± 0.5V

High voltage check

1. Select an active TV channel and confirm that horizontal is in sync.
2. Adjust BRIGHTNESS and PICTURE using PICTURE icon menu so video just disappears.
3. Confirm B+ 144 ± 1.5V is within limit.
4. Using a high voltage meter confirm that the high voltage is 33.0kV ± 1.0kV

SCHEMA99

http://schema99.host.sk/

14 Service mode (electronic adjustments)

TOP PREVIOUS NEXT

This receiver has electronic technology using the IC bus concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed byusing “on screen display menu”. (The service adjustment mode).

NOTE

It is suggested that the technician reads all the way through and understand the following procedure for entering/exiting the service adjustment mode; then proceed with the instructions working with the receiver. When becoming familiarwith the procedure, the flow chart for service mode may be used as a quick guide.

Quick entry to service mode

When minor adjustments need to be done to the electronic controls, the method of entering the service mode without removal of the cabinet back is as follows using the remote control:

1. Select SET-UP icon and select CABLE mode.
2. Select TIMER icon and set SLEEP time for 30 Min.
3. Exit menus.
4. Tune to the channel 124.
5. Adjust VOLUME to minimum (0).
6. Press VOL → (decrease) on receiver. Red “CHK” appears in upper corner.

   NOTE

   After receiver is set into service mode, set TIMER back to NO.

   To toggle between aging and service modes:

   While the “CHK” is displayed on the left top corner of the CRT, pressing “ACTION” and “VOL” UP on the TV simultaneously will toggle between the modes. Red “CHK” for serviceand yellow “CHK” for aging.

7. Press POWER on the remote control to display the service adjustment modes menu, select adjustment by pressing the volume right/left buttons and channel up/down buttons on the remote and ACTION to enter the adjustment.

SCHEMA99

http://schema99.host.sk/

	480I	480P	1080I	
MODE	4:3	16:9	DW	D-IN
MTS	MTSIN	SEPAL	SEPAH	
CLOCK	CLOCK			
VIDEO	COLOR	TINT	BRIGHT	CONT
	B-Y_G	CUT G	CUT R	CUT B
	BRT	R DR	B DR	
HDEF	H LIN	H POS	H WID	PCC
	PCCHG	PCCLG	PCCHS	PCCLS
	TOPG	BTMG	TOPSL	BTMSL
	TRAP	PARA	SIDE	HTRAP
VDEF	V RAS	VEAMP	V-C	V-S
DAF	HDAFS	VDAFG		
OTHER	VMM_G	VMM_P	HHS	EW_SW
	VTOP	SOSSW		
EEP	AREA	IN▶EX	EX▶IN	

NOTE

Some adjustments are available only in some modes (480i, 480p, 1080i); it is needed to apply the format. A 1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

Exiting the service mode:

This TV goes out from service mode when it is unplugged or turned OFF. To exit the service mode, turn the TV OFF or unplug the TV from A.C.

Other method

Press ACTION and POWER on the receiver simultaneously for at least 2 seconds.

The receiver momentarily shuts off; then comes back on tuned to channel 3 with a preset level of sound.

Any programmed channels, channels caption data and some others user defined settings will be erased when exited by pressing ACTION and POWER on receiver.

IMPORTANT NOTE

Always check that the TV exits the service mode.

To confirm colors

When in service mode (red "CHK" is displayed) press RECALL on the remote control to enter the purity field check mode

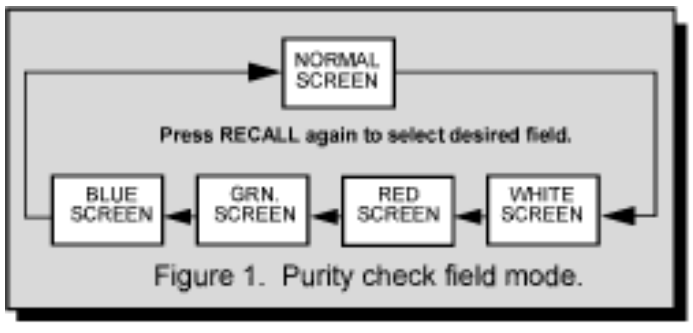


Figure 1. Purity check field mode.

Entering service mode (open-back method)

While the receiver is connected and operating in normal mode, momentarily short test point

SCHEMA99

http://schema99.host.sk/

FA1 (A15 pin 2) to cold ground (A-Board).

The receiver enters the aging mode.

Yellow letters “CHK” appear in the upper left corner of the screen.
(The volume right/left and channel up/down will adjust rapidly).

14.1 Service adjustment default values for service items

14.2 Instructional flow chart for service mode

TOP PREVIOUS NEXT

SCHEMA99

http://schema99.host.sk/

14.1 Service adjustment default values for service items

TOP PREVIOUS NEXT

REGISTER	DESCRIPTION	FORMAT			
		NTSC	480p (16:9)	1080i (16:9)	1080i (4:3)
MTSIN	INPUT LEVEL	1A			
SEPAL	LOW LEVEL SEPARATION	6			
SEPAH	HIGH LEVEL SEPARATION	20			
CLOCK	CLOCK	128			
COLOR	COLOR	2F		17	
TINT	TINT	76		81	
BRIGH	SUB-BRIGHTNESS	3B		42	
CONT	SUB-CONTRAST	23		65	
B-Y_G	MAGENTA TINT ADJ	2E		3E	
CUT G	GREEN CUT-OFF	01 65			
CUT R	RED CUT-OFF	01 85			
CUT B	BLUE CUT-OFF	01 A6			
BRT	BGRIGHT				
R DR	RED DRIVE	A0			
B DR	BLUE DRIVE	A0			
HLIN	HORIZONTAL LINEARITY	79		7F	
HPOS	HORIZONTAL POSITIONING	01 7A		01 82	
HWID	HORIZONTAL WIDTH	54		2F	
PCC	PINCUSHION CORRECTION	50	2A	31	3E
PCCHG	PINCUSHION HIGH	6	0A	9	7
PCCLG	PINCUSHION LOW	2	7	5	9
PCCHS	PINCUSHION HIGH	4	3	3	3
PCCLS	PINCUSHION LOW	3	3	3	3
TOPG	TOP CORNER PINCUSHION	5B	55	4C	5B
BTMG	BOTTOM CORNER PINCUSHION	45	32	49	4A
TOPSL	TOP CORNER PINCUSHION SLICE LEVEL	2	8	6	7
BTMSL	BOTTOM CORNER PINCUSHION SLICE LEVEL	2	8	5	7
TRAP	TRAPEZOID	83	7E	7F	7D
PARA	PARALLELOGRAM	3	4	4	8
SIDE	E-W PINCUSHION ADJUSTMENT	4	6	7	8
HTRAP	HORIZONTAL TRAPEZOID	1A	1A	1A	14
VRAS	VERTICAL POSITION	8C	71	7B	79
VEAMP	VERTICAL SIZE	A8	E2	99	9A
V-C	VERTICAL LINEARITY	21	26	25	24
V-S	VERTICAL S CORRECTION	30	25	17	33
HDAFS	HORIZONTAL DAF PHASE	59		01 C5	A0
VDAFG	VERTICAL DAF GAIN	A0	63	60	0
VMM_G	----------	F0		F0	
VMM_P	----------	F3		F3	
HHS	----------	CB			
EW_SW	----------	0	0	0	
VTOP	----------	9C	7E	79	9B

SCHEMA99

http://schema99.host.sk/

SOSSW	----------	1		1	

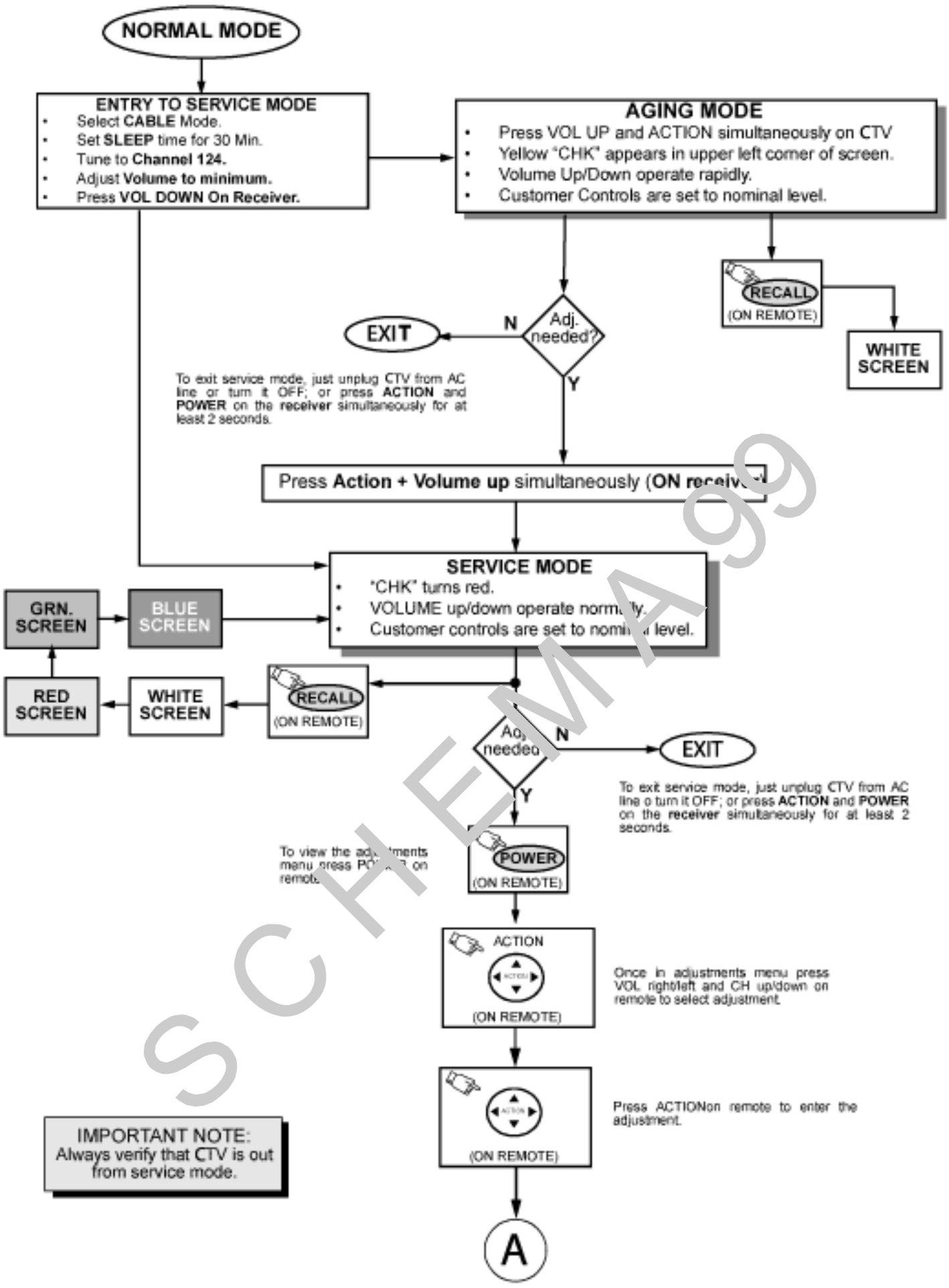
NOTE:

The above table shows the default values for the service items, this values can change depending on the serviced TV.

TOP PREVIOUS NEXT

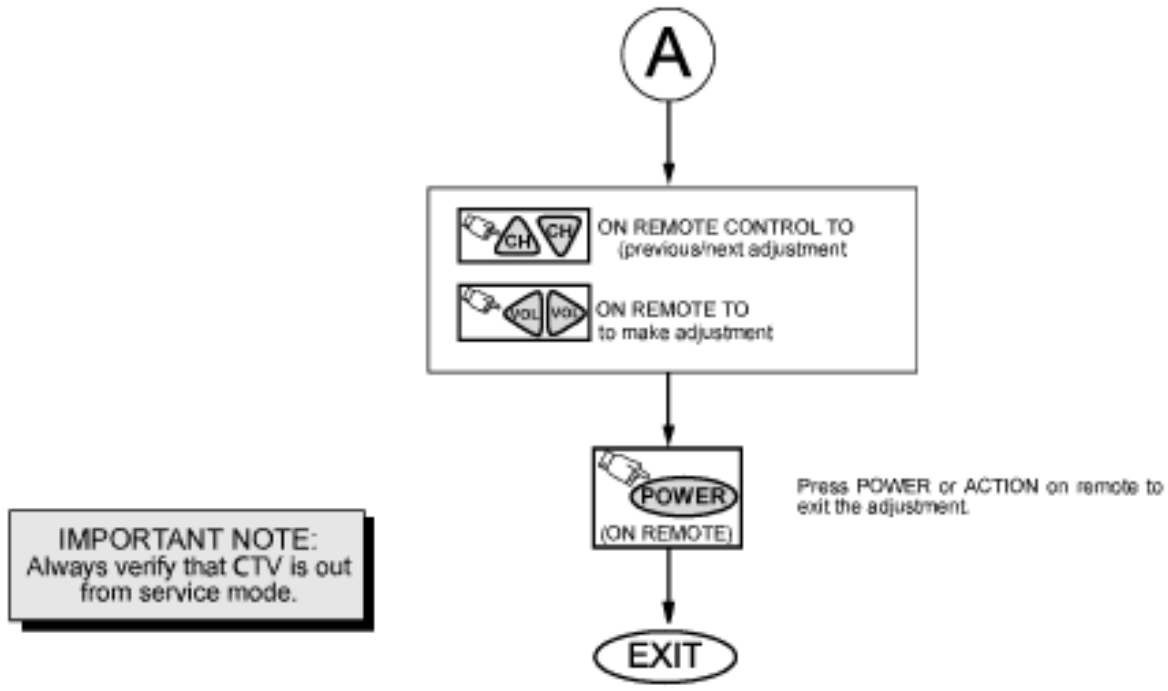
SCHEMA 99

14.2 Instructional flow chart for service mode


NORMAL MODE
ENTRY TO SERVICE MODE
Select CABLE Mode.
Set SLEEP time for 30 Min.
Tune to Channel 124.
Adjust Volume to minimum.
Press VOL DOWN On Receiver.
AGING MODE
Press VOL UP and ACTION simultaneously on CTV
Yellow "CHK" appears in upper left corner of screen.
Volume Up/Down operate rapidly.
Customer Controls are set to nominal level.
RECALL
(ON REMOTE)
WHITE SCREEN
Adj. needed?
N
EXIT
Y
To exit service mode, just unplug CTV from AC line or turn it OFF; or press ACTION and POWER on the receiver simultaneously for at least 2 seconds.
Press Action + Volume up simultaneously (ON receiv
SERVICE MODE
"CHK" turns red.
VOLUME up/down operate normally.
Customer controls are set to nominal level.
GRN. SCREEN
BLUE SCREEN
RED SCREEN
WHITE SCREEN
RECALL
(ON REMOTE)
Adj. needed?
N
EXIT
Y
To exit service mode, just unplug CTV from AC line o turn it OFF; or press ACTION and POWER on the receiver simultaneously for at least 2 seconds.
To view the adjustments menu press POWER on remote.
POWER
(ON REMOTE)
ACTION
(ON REMOTE)
Once in adjustments menu press VOL right/left and CH up/down on remote to select adjustment.
(ON REMOTE)
Press ACTIONon remote to enter the adjustment.
A
IMPORTANT NOTE:
Always verify that CTV is out from service mode.

SCHEMA99

http://schema99.host.sk/

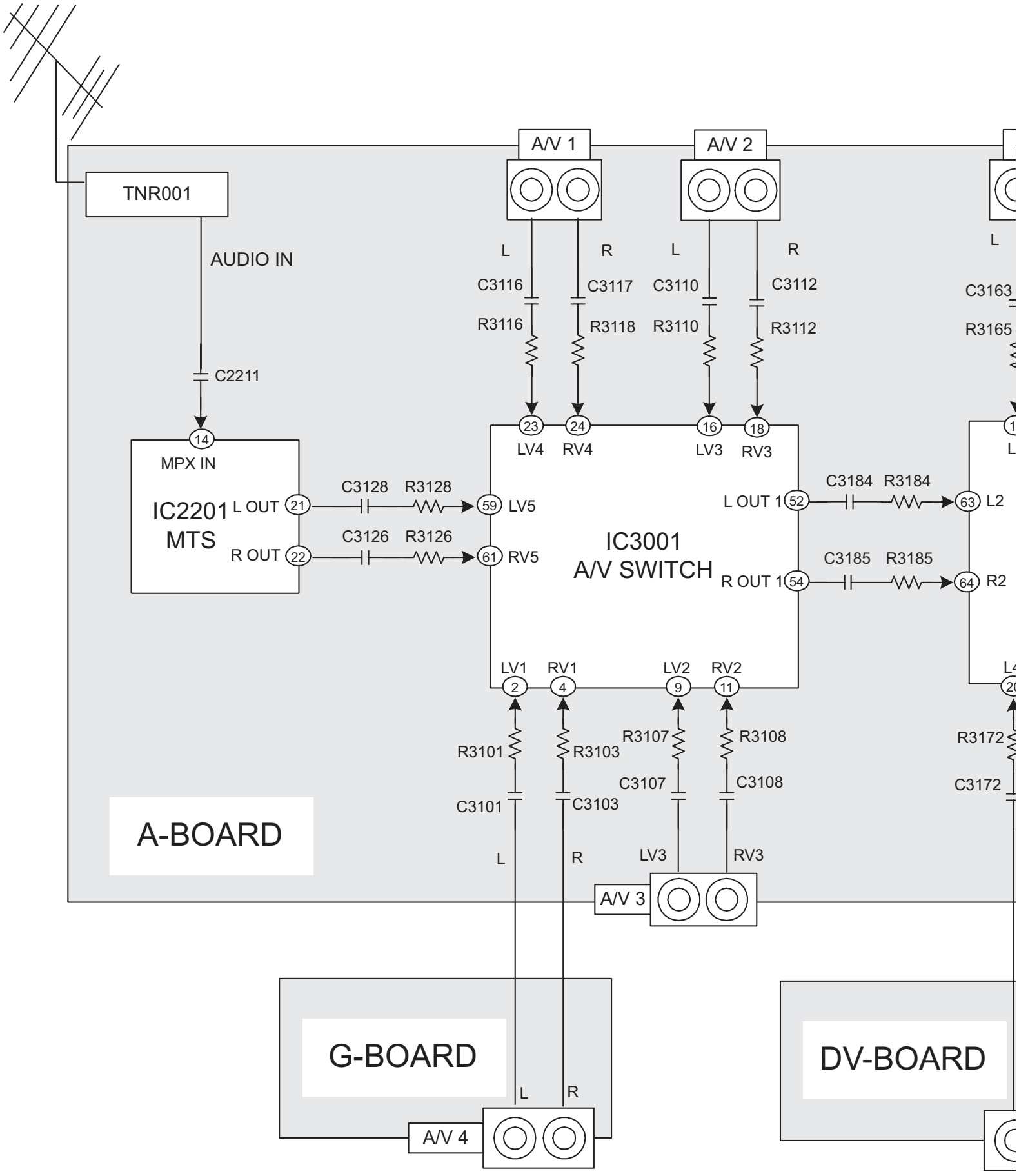


IMPORTANT NOTE:
Always verify that CTV is out from service mode.

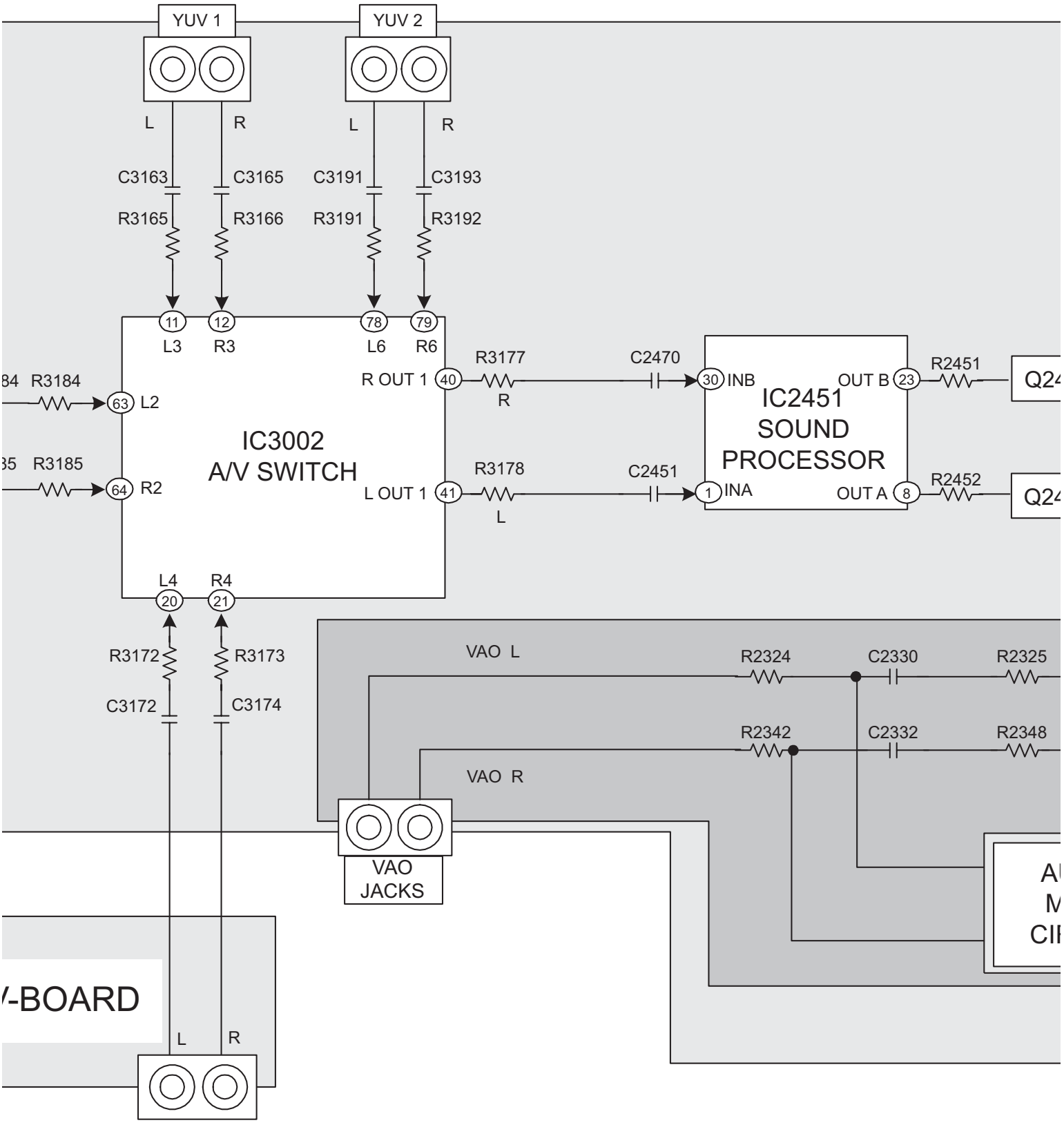
To exit service mode, just unplug CTV from AC line or turn it OFF; or press **ACTION** and **POWER** on the **receiver** simultaneously for at least 2 seconds.

SCHEMA 99

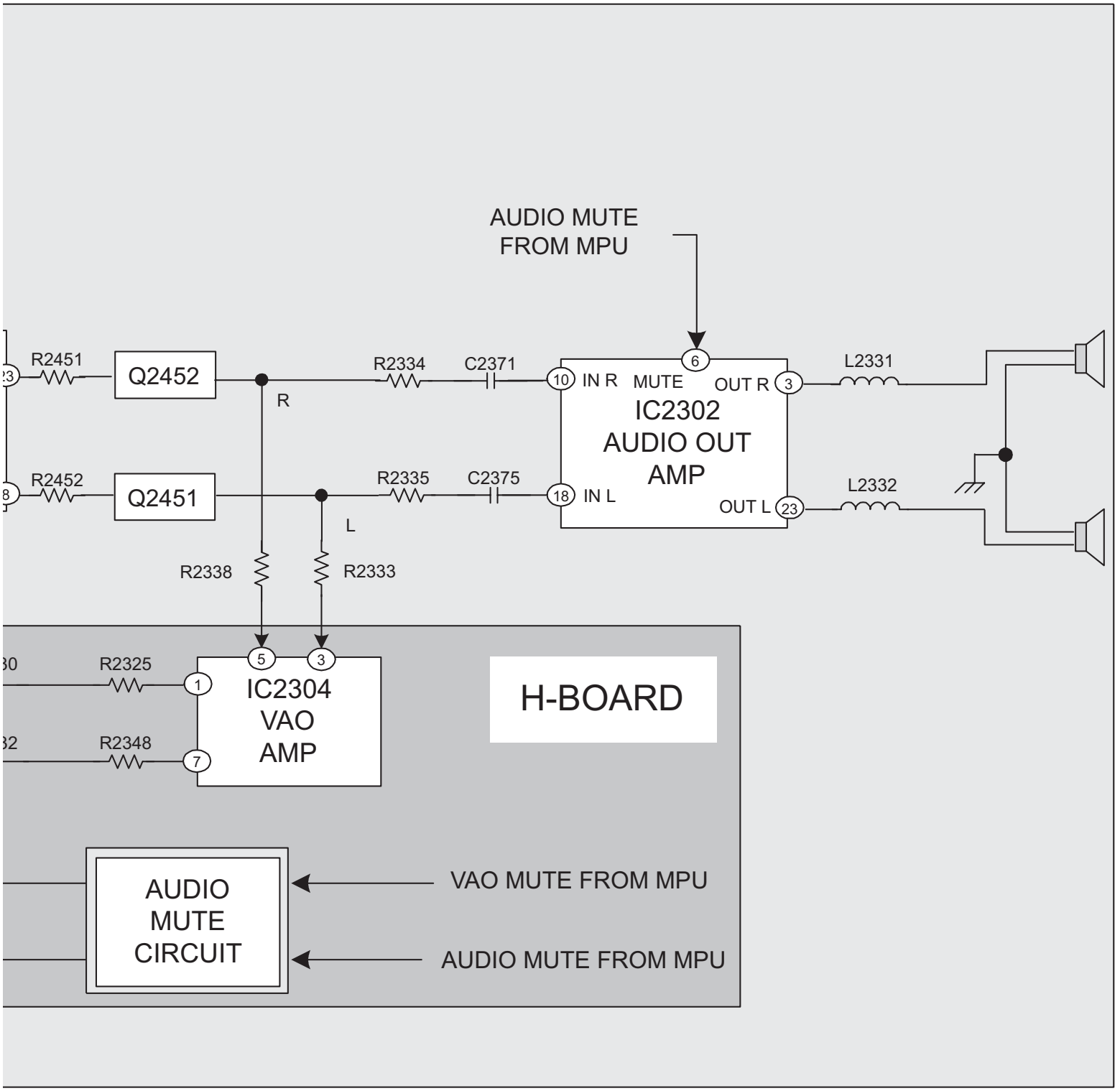
http://schema99.host.sk/



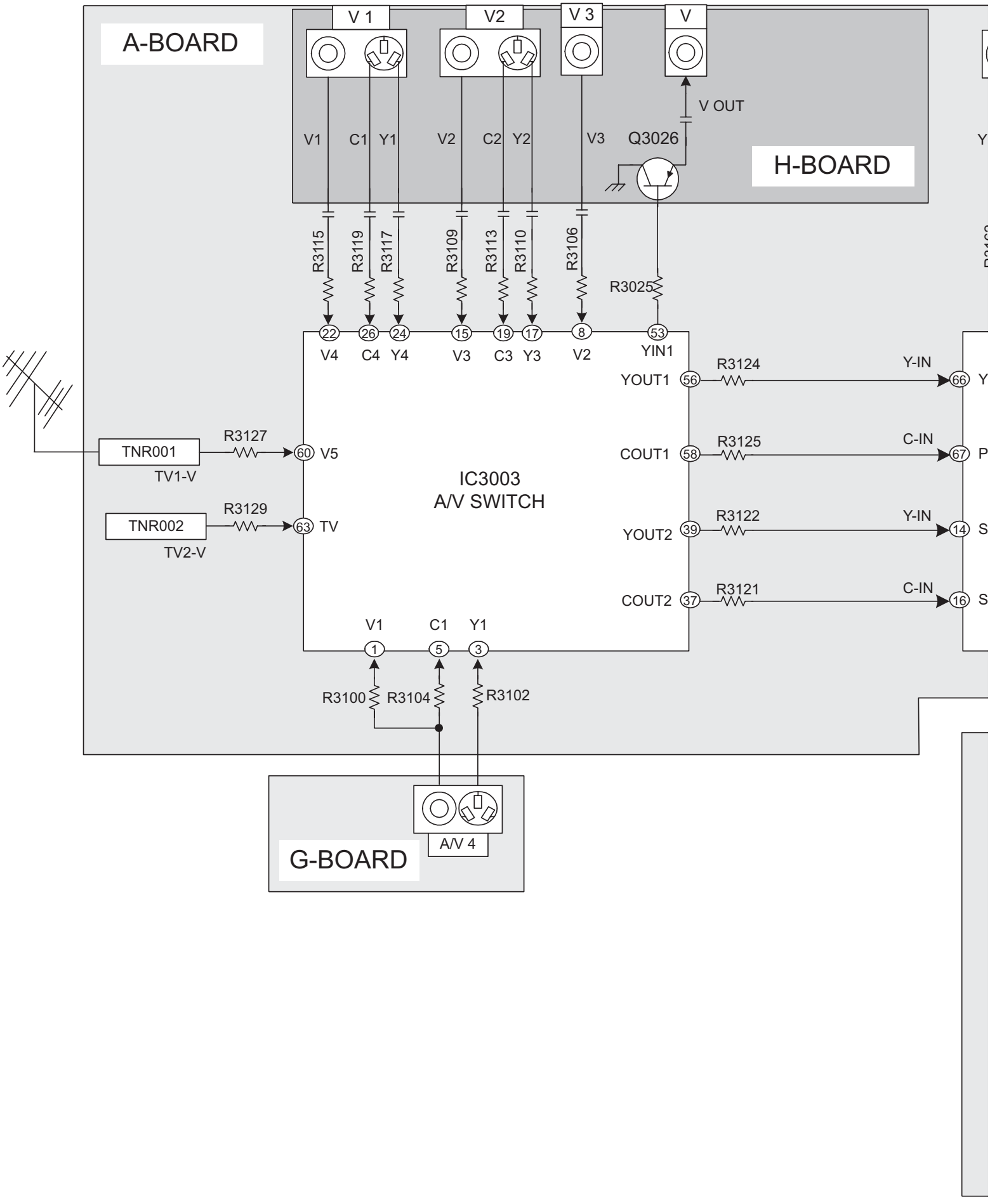
AUDIO BLOCK DIAGRAM 1/3 CT-32HC14J/UJ



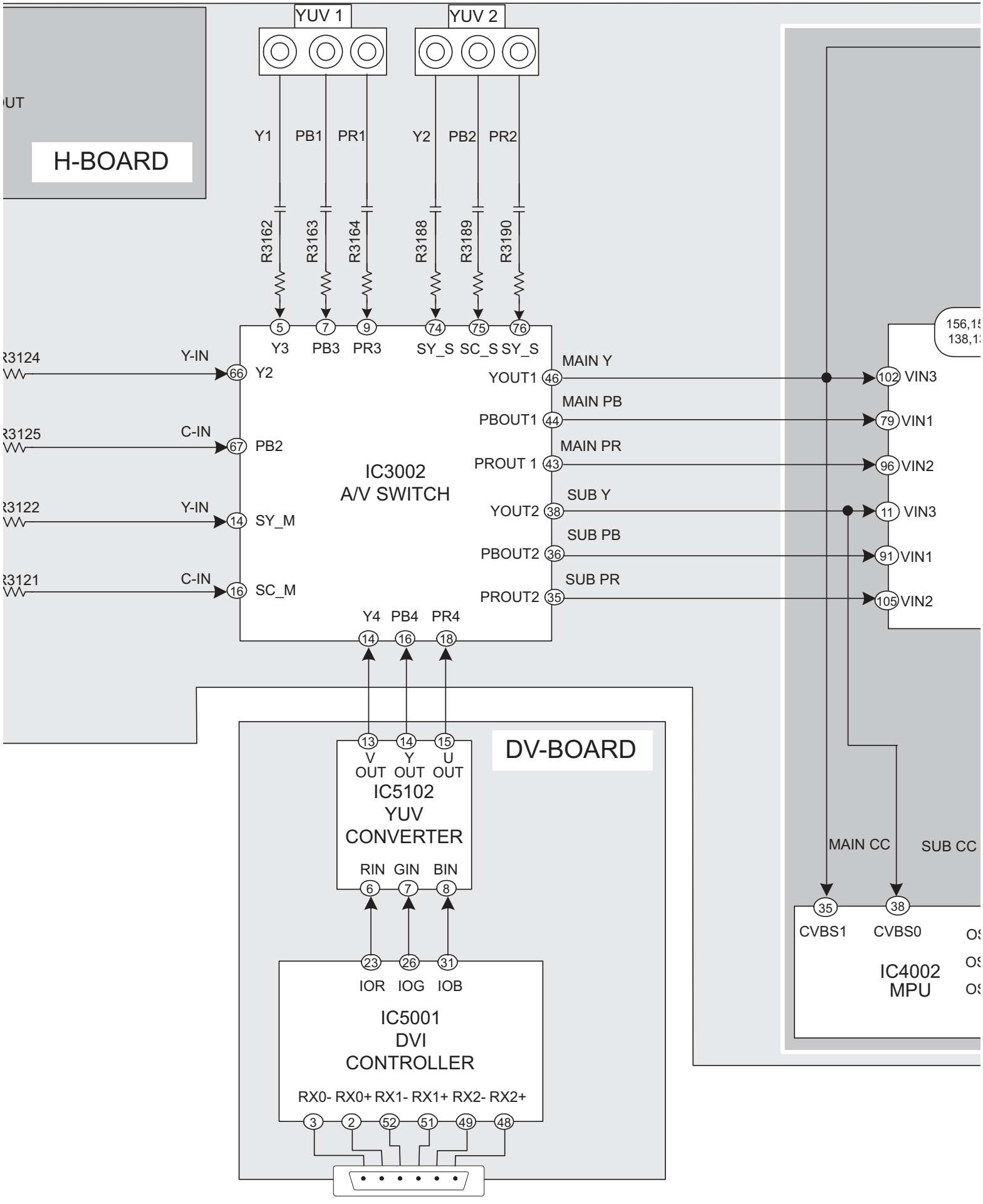
AUDIO BLOCK DIAGRAM 2/3 CT-32HC14J/UJ



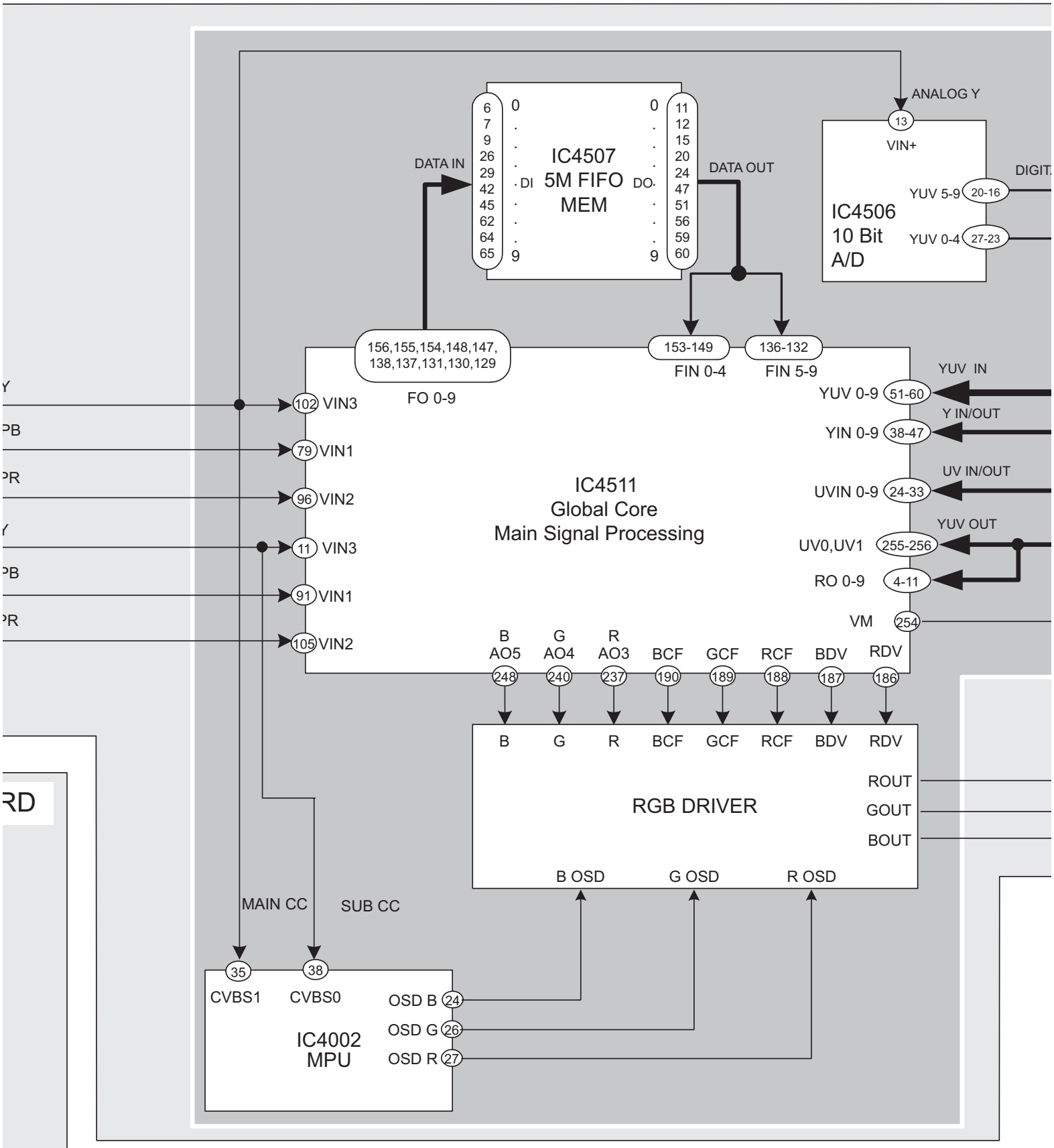
AUDIO BLOCK DIAGRAM 3/3 CT-32HC14J/UJ



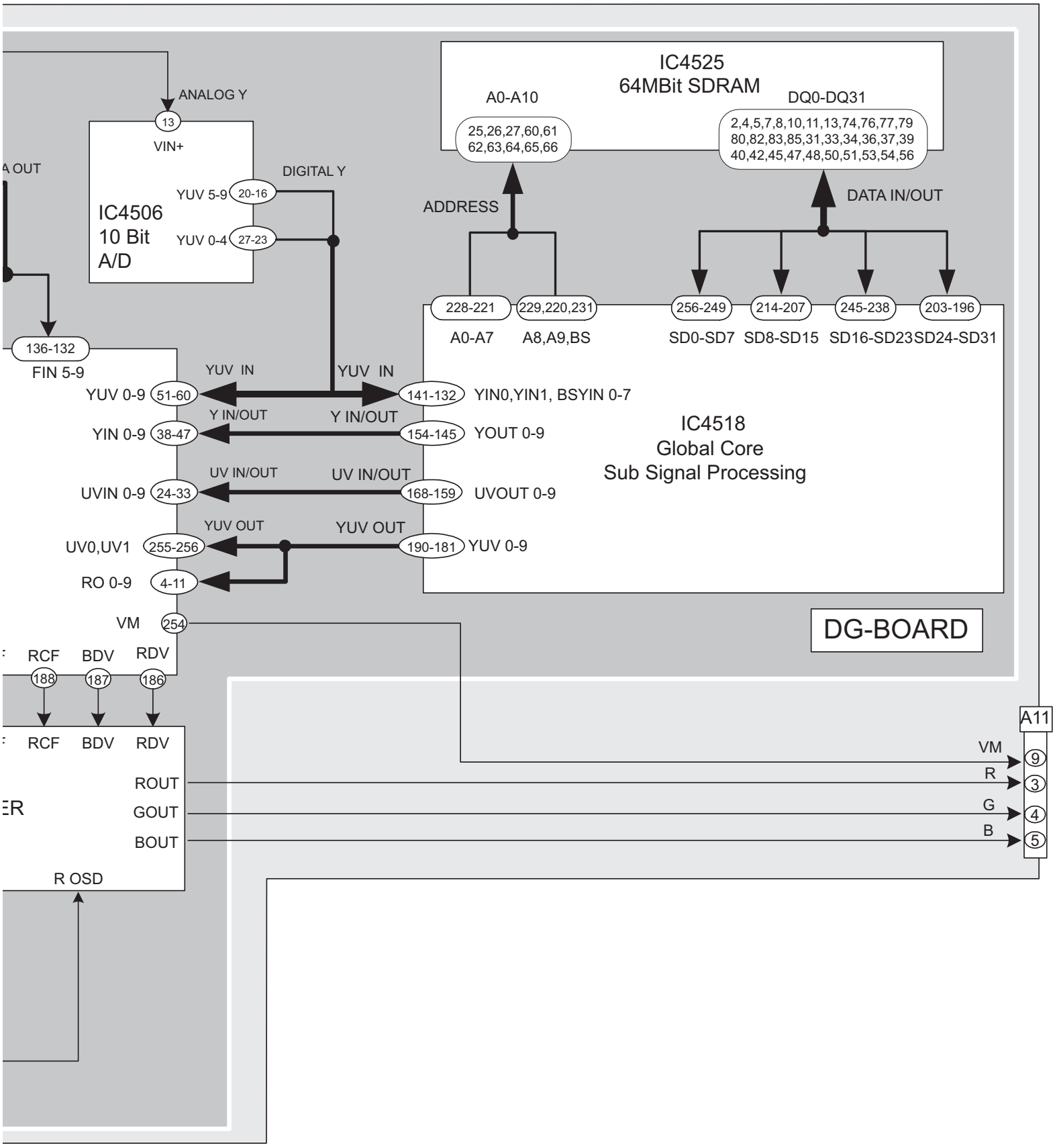
VIDEO BLOCK DIAGRAM 1/4 CT-32HC14J/UJ



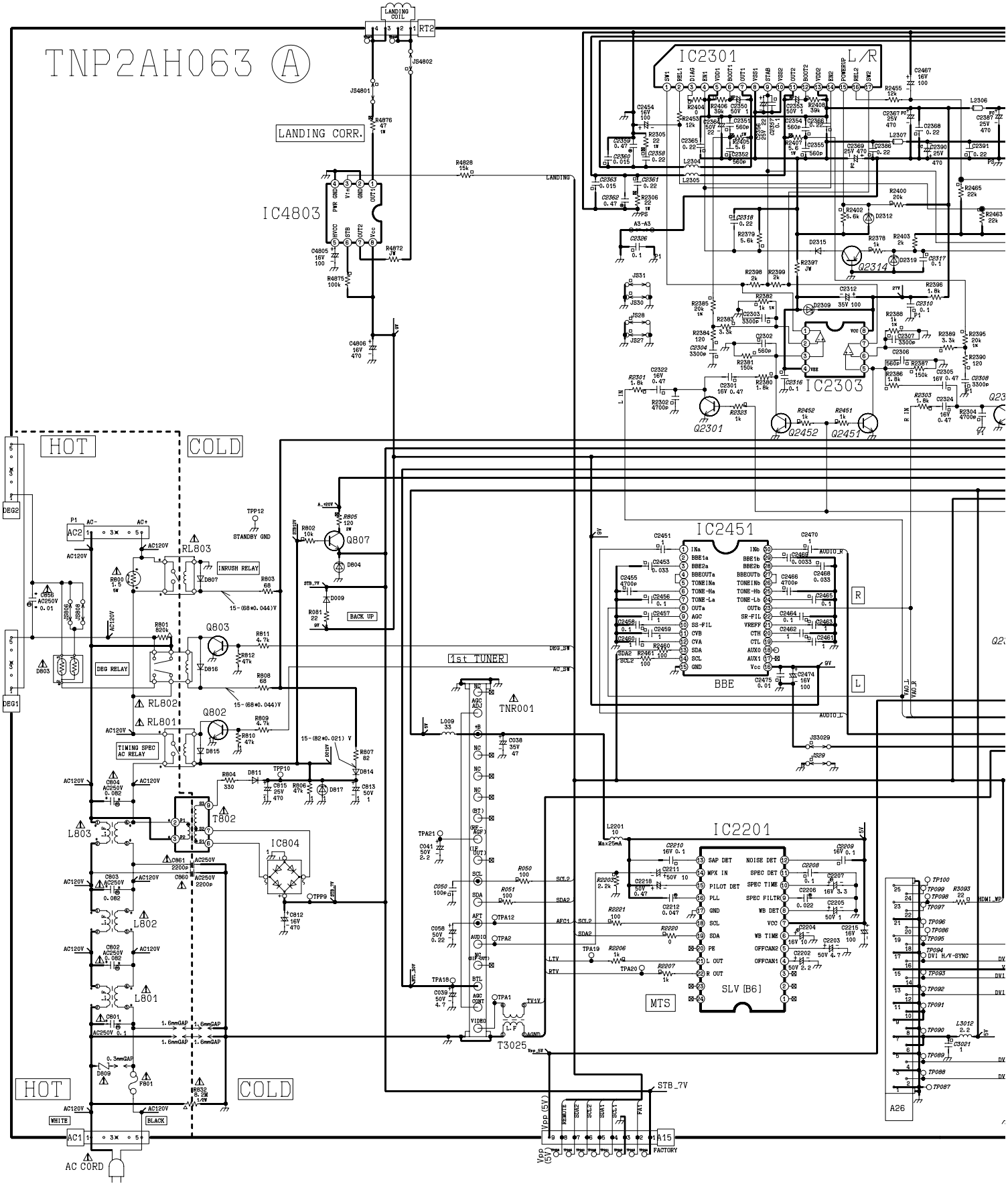
VIDEO BLOCK DIAGRAM 2/4 CT-32HC14J/UJ



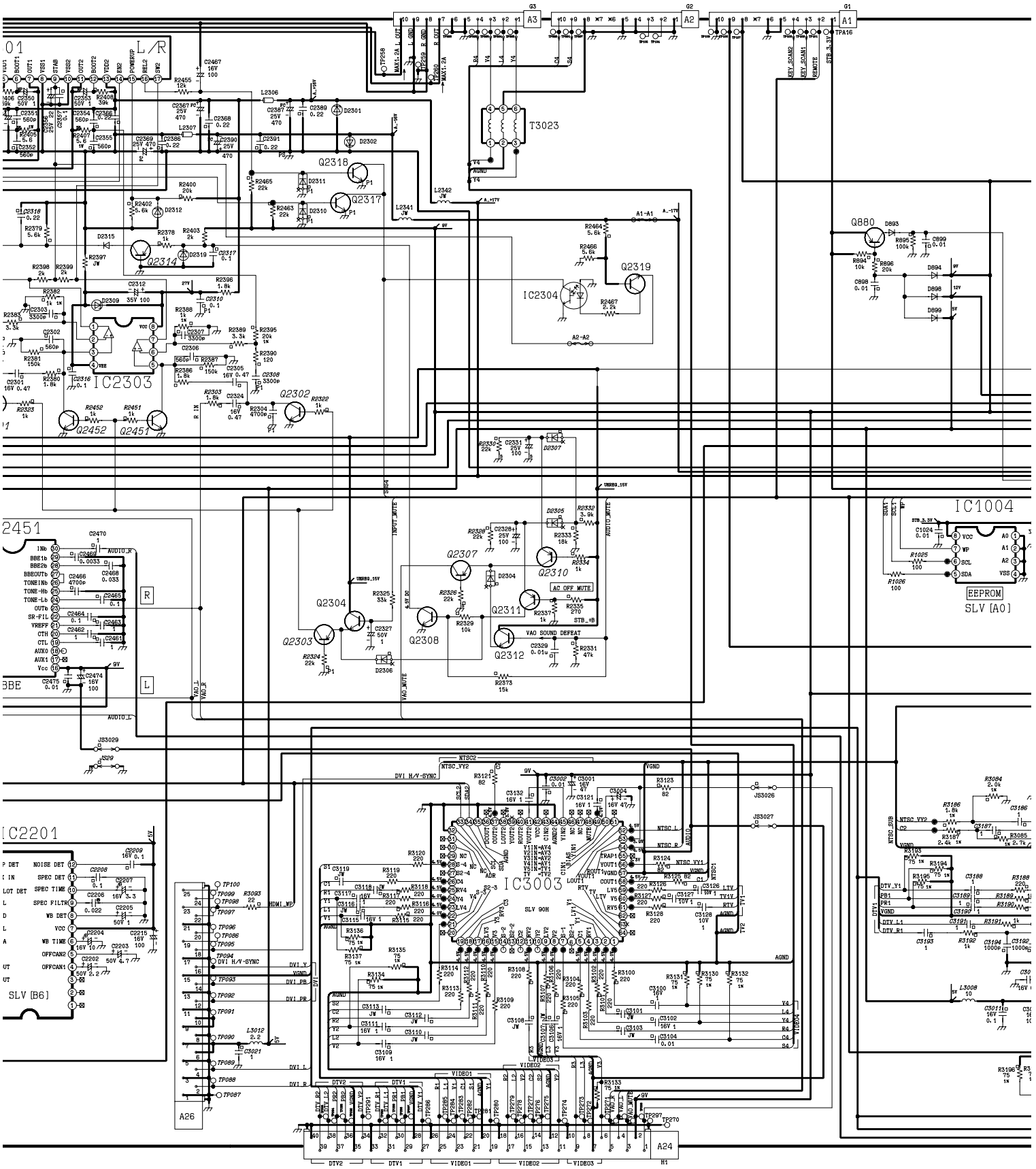
VIDEO BLOCK DIAGRAM 3/4 CT-32HC14J/UJ



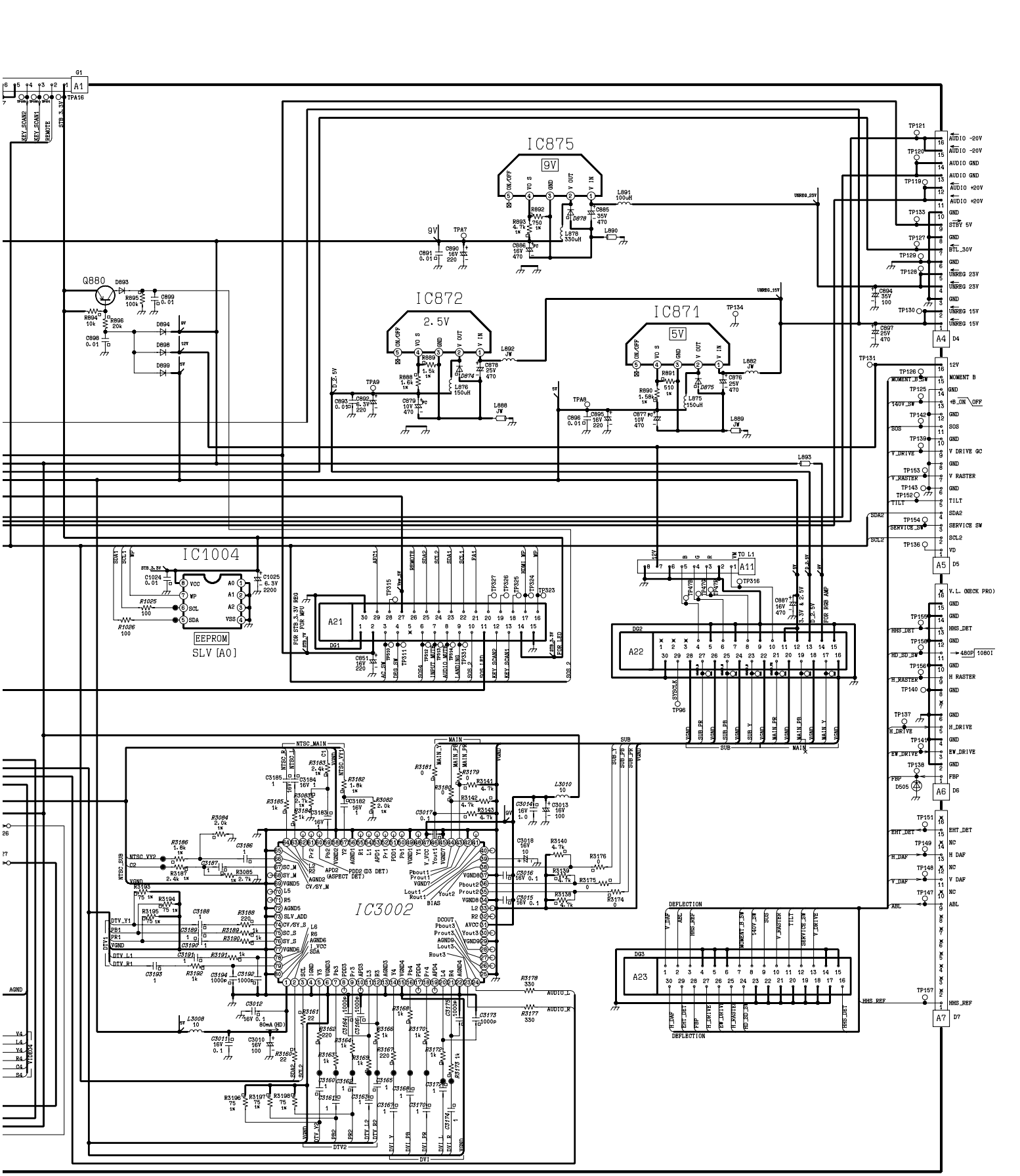
VIDEO BLOCK DIAGRAM 4/4 CT-32HC14J/UJ


TNP2AH063 Ⓐ
IC2301 L/R
IC4803
LANDING CORR.
LANDING COIL
RT2
JS4602
JS4801
R4876 47 1W
R4828 15k
LANDING
C4805 16V 100
R4872 1W
R4875 100k
C4806 16V 470
IC2303
Q2301
Q2452
Q2451
Q2314
D2312
D2315
D2319
HOT
COLD
DEG2
DEG1
AC2
AC1
AC CORD
WHITE
BLACK
AC120V
RL803
RL802
RL801
INRUSH RELAY
DEG RELAY
TIMING SPEC AC RELAY
Q803
Q802
Q807
D804
D807
D816
D815
D809
D803
D814
D817
D811
D009
BACK UP
STANDBY GND
TPP12
TPP10
TPP9
R805 120 5W
R802 10k
R801 820k
R803 68
R808 68
R811 4.7k
R812 47k
R809 4.7k
R810 47k
R804 330
R807 82
R806 47k
15-(68±0.044)V
15-(82±0.021) V
T802
L803
L802
L801
IC804
P801
0.3mmGAP
1.6mmGAP
1st TUNER
TNR001
T3025
L.F
IC2451
BBE
R
L
IC2201
MTS
SLV [B6]
A26
FACTORY
STB_7V
Vpp (5V)
REMOTE
SCL2
SDA2
SCL1
SDA1
FAT
A15
TP100
TP099
TP098
TP097
TP096
TP095
TP094
TP093
TP092
TP091
TP090
TP089
TP088
TP087
HDMI_MP
DV1 H/V-SYNC

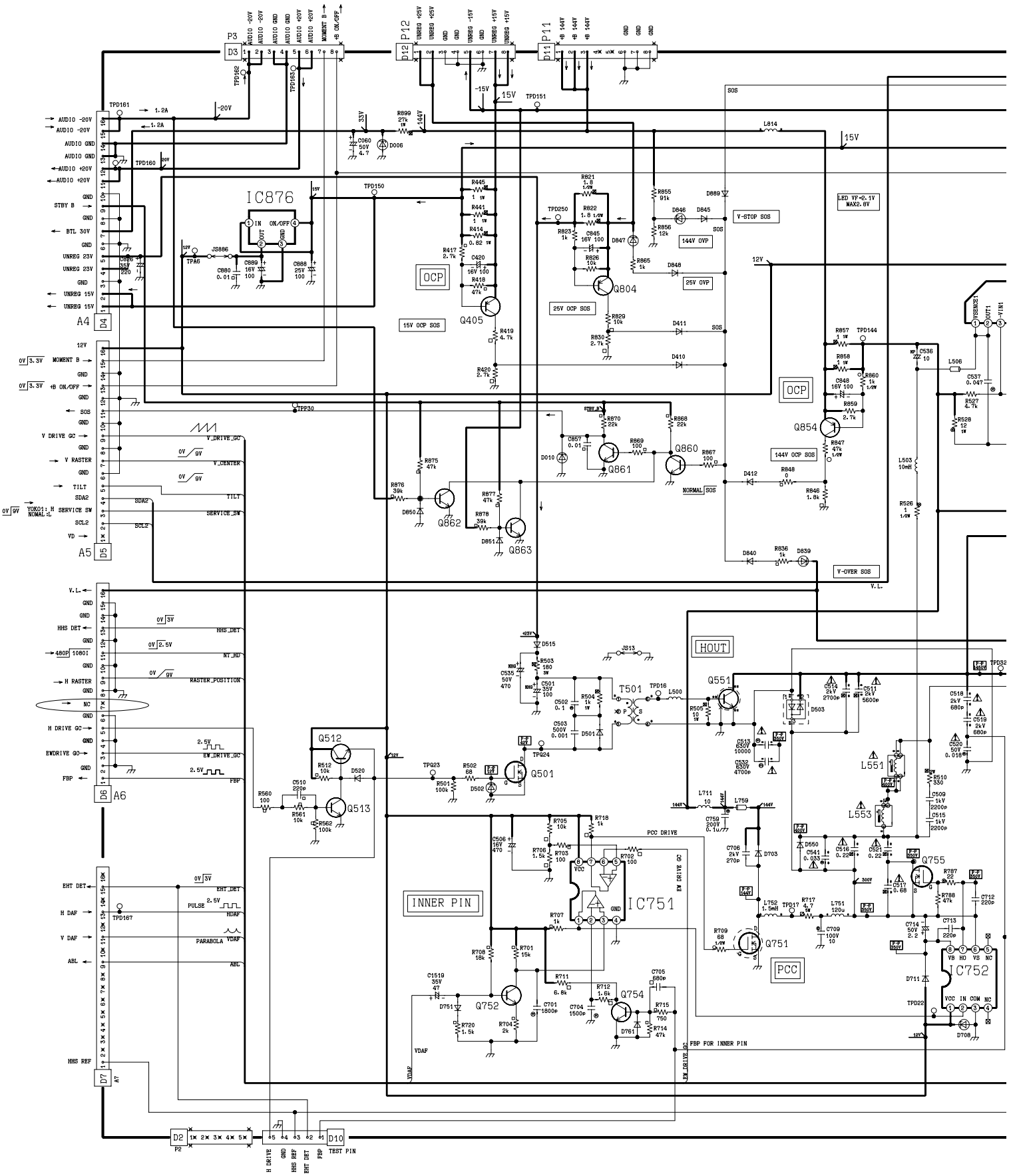
1	2	3	4	5	6	7	8


IC2303
IC2304
IC2310
IC2451
IC2201
IC3003
IC1004
EEPROM
SLV [A0]
SLV [B6]
SLV 90H
T3023
Q2318
Q2317
Q2314
Q2319
Q2302
Q2452
Q2451
Q2304
Q2303
Q2307
Q2308
Q2311
Q2312
Q880
AUDIO_MUTE
INPUT_MUTE
AC OFF MUTE
VAO SOUND DEFEAT
STB_+B
HDMI_WP
DVI H/V-SYNC
NTSC_VY2
NTSC_VY1
A26
A24

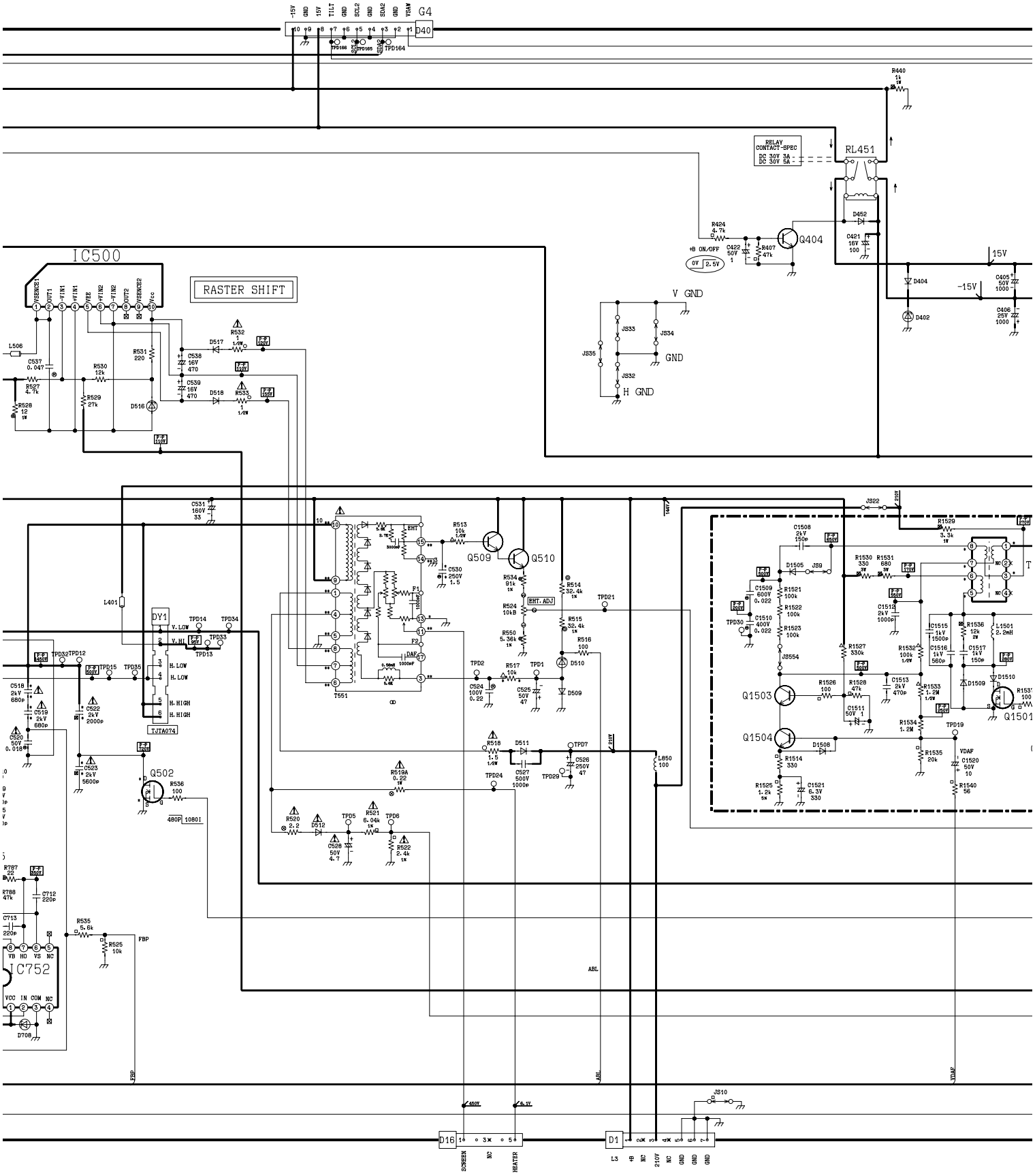
1	2	3	4	5	6	7	8


IC875
9V
IC872
2.5V
IC871
5V
IC1004
EEPROM
SLV [A0]
IC3002
A1
A4
A5
A6
A7
A11
A21
A22
A23
DG1
DG2
DG3
TP121
TP120
TP119
TP133
TP127
TP129
TP128
TP130
TP131
TP126
TP125
TP142
TP139
TP153
TP143
TP152
TP154
TP136
TP155
TP158
TP156
TP140
TP137
TP141
TP138
TP151
TP149
TP148
TP147
TP157
TP134
TP316
TP96
AUDIO -20V
AUDIO GND
AUDIO +20V
STBY 5V
BTL_30V
UNREG 23V
UNREG 15V
12V
MOMENT B
+B_ON
140V_SW
SCS
V DRIVE GC
V_DRIVE
V RASTER
TILT
SDA2
SERVICE SW
SCL2
VD
V.L. (NECK PRO)
HHS_DET
480P 1080I
H RASTER
H_DRIVE
EW_DRIVE
FBP
EHT_DET
H DAF
V DAF
ABL
HHS_REF
DEPLOTION
NTSC_MAIN
NTSC_SUB
MAIN
SUB
AUDIO_L
AUDIO_R
DTV1
DTV2
DVI1
80mA (HD)

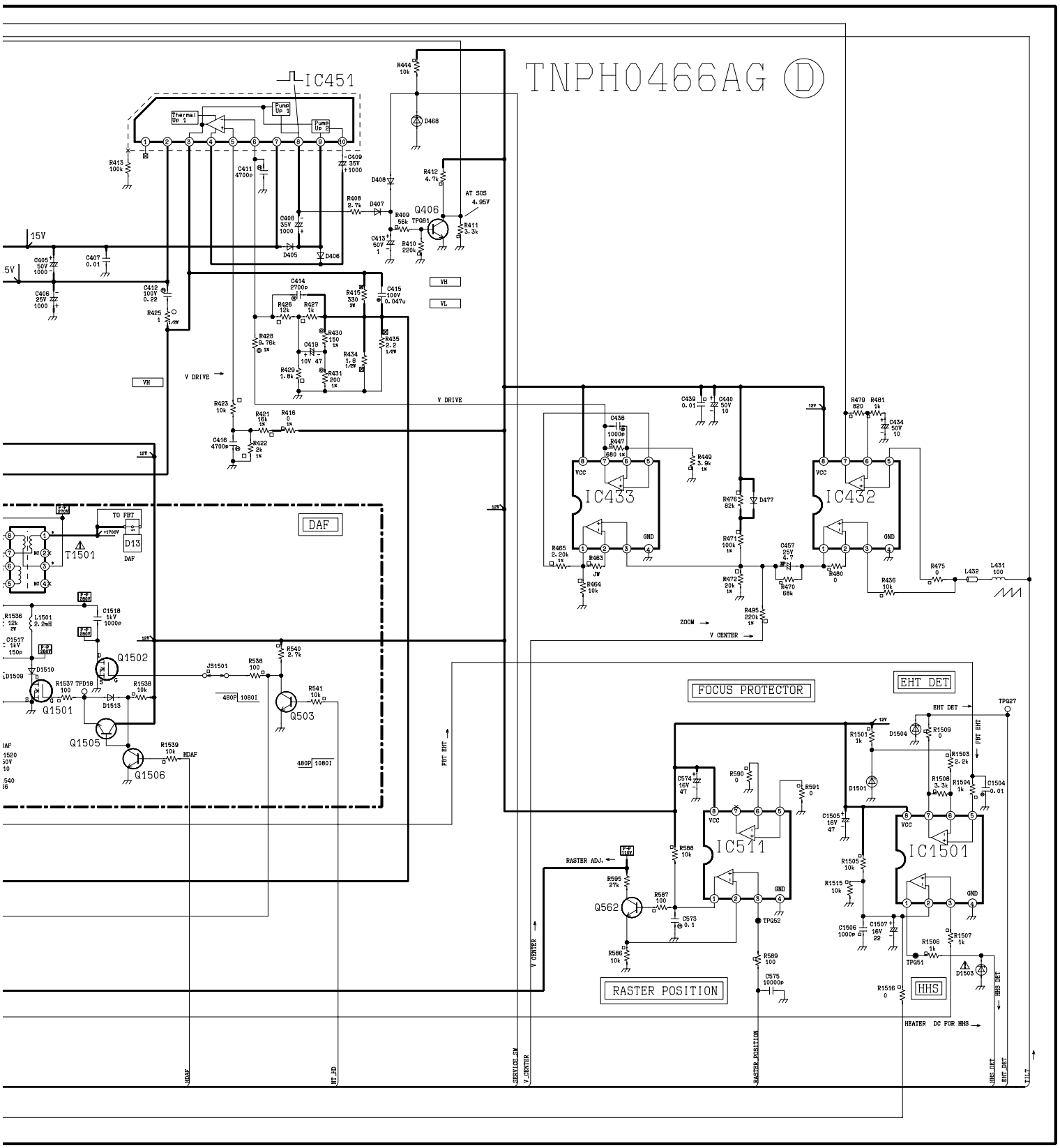
1	2	3	4	5	6	7	8



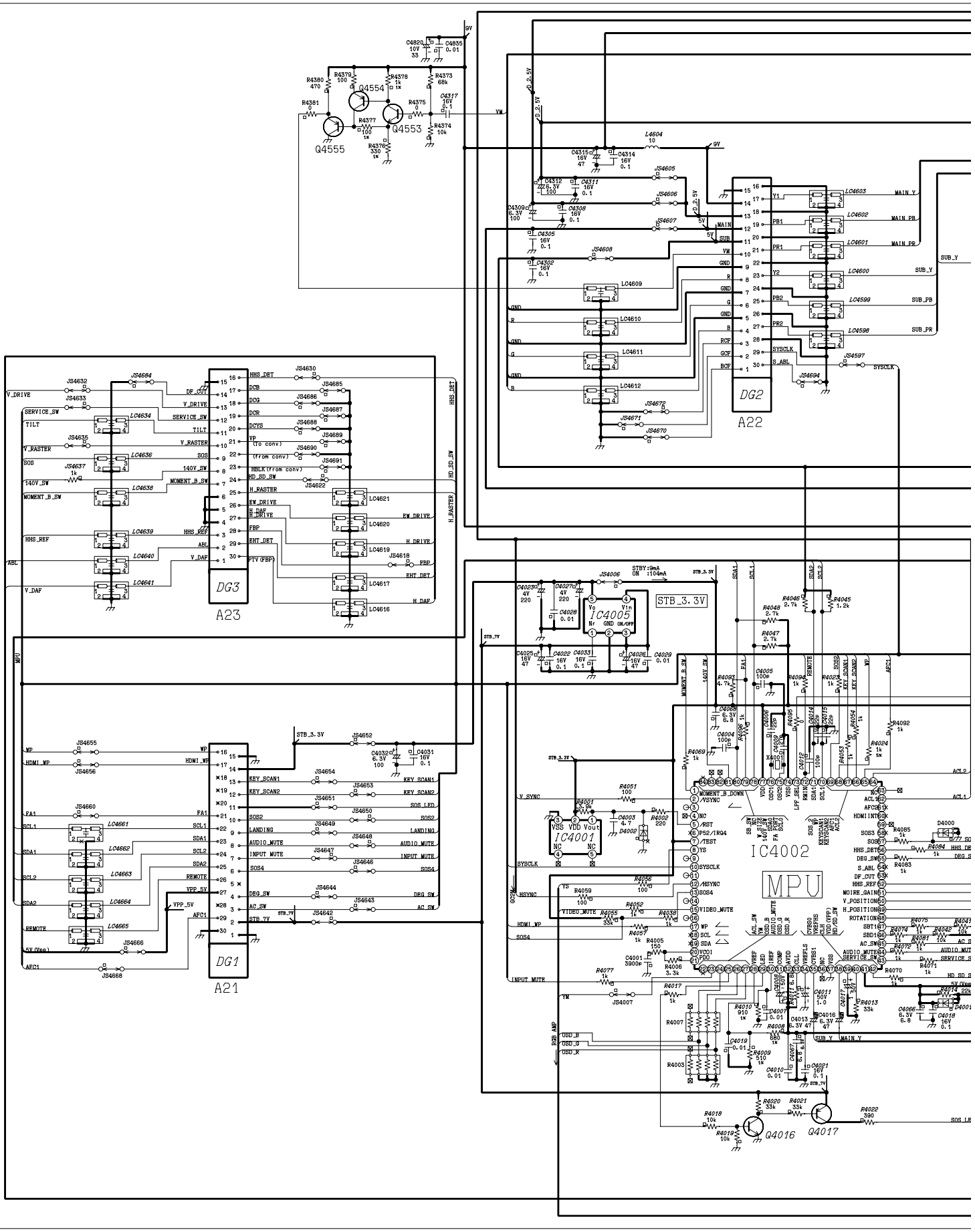
D-BOARD 1/3 TNPH0466AG CT-32HC14J/UJ


G4
D40
RL451
RELAY CONTACT-SPEC
DC 30V 3A
DC 30V 5A
IC500
RASTER SHIFT
Q404
Q509
Q510
Q502
Q1503
Q1504
Q1501
V GND
GND
H GND
15V
-15V
DY1
TJTA074
IC752
D16
D1
SCREEN
HEATER
+B
210V
ABL
FBP
VDAF

1	2	3	4	5	6	7	8

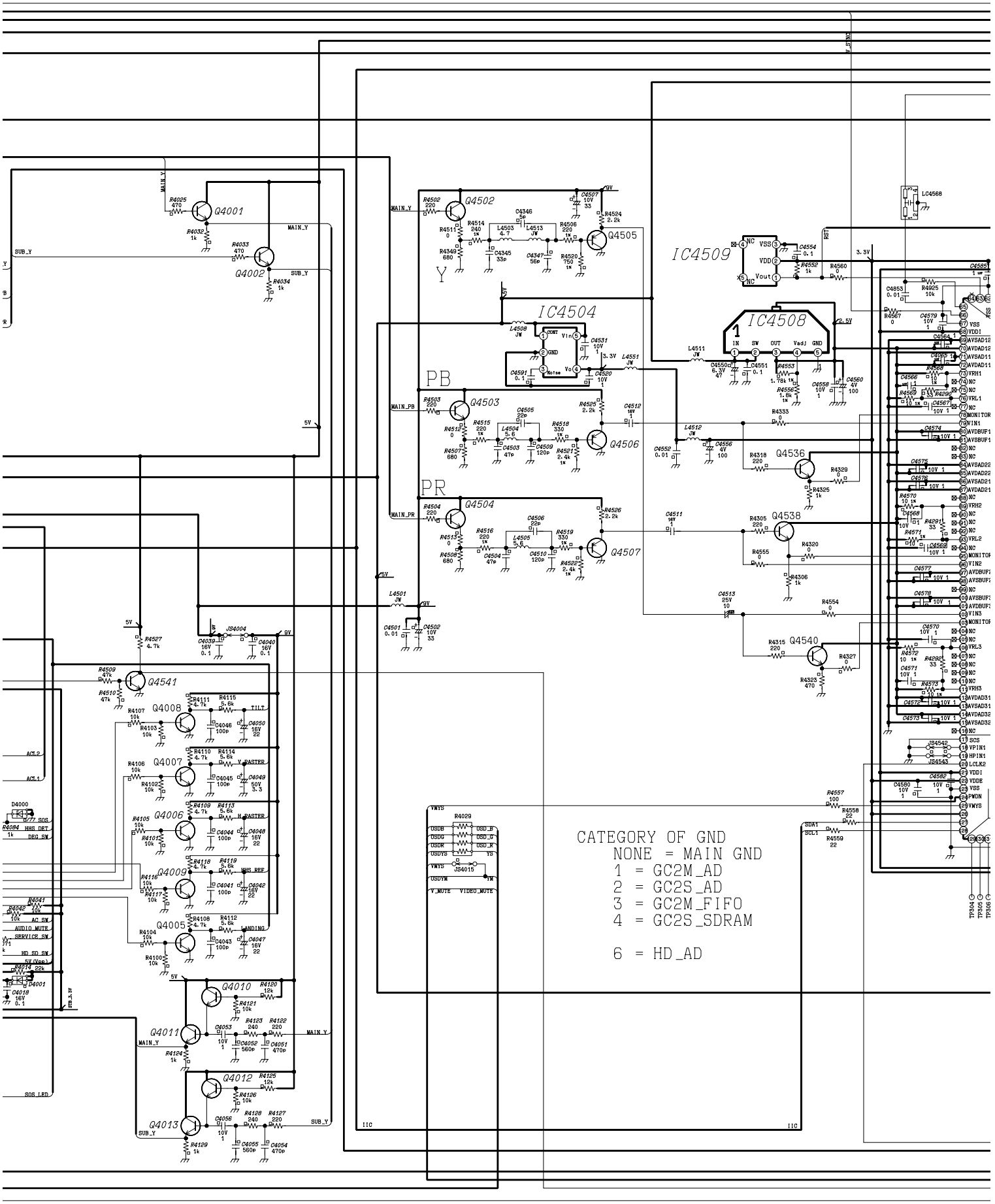

TNPH0466AG Ⓓ
IC451
Thermal Dp 1
Pump Up 1
Pump Up 2
D468
D408
D407
D405
D406
Q406
AT SOS 4.95V
15V
5V
VH
VL
V DRIVE
IC433
IC432
DAF
TO FBT
T1501
Q1502
Q1501
Q1505
Q1506
Q503
JS1501
HDAF
FOCUS PROTECTOR
EHT DET
IC511
IC1501
RASTER ADJ.
Q562
RASTER POSITION
ZOOM
V CENTER
HHS
HEATER DC FOR HHS
FBT EHT
SERVICE SW
NT_HD
TILT

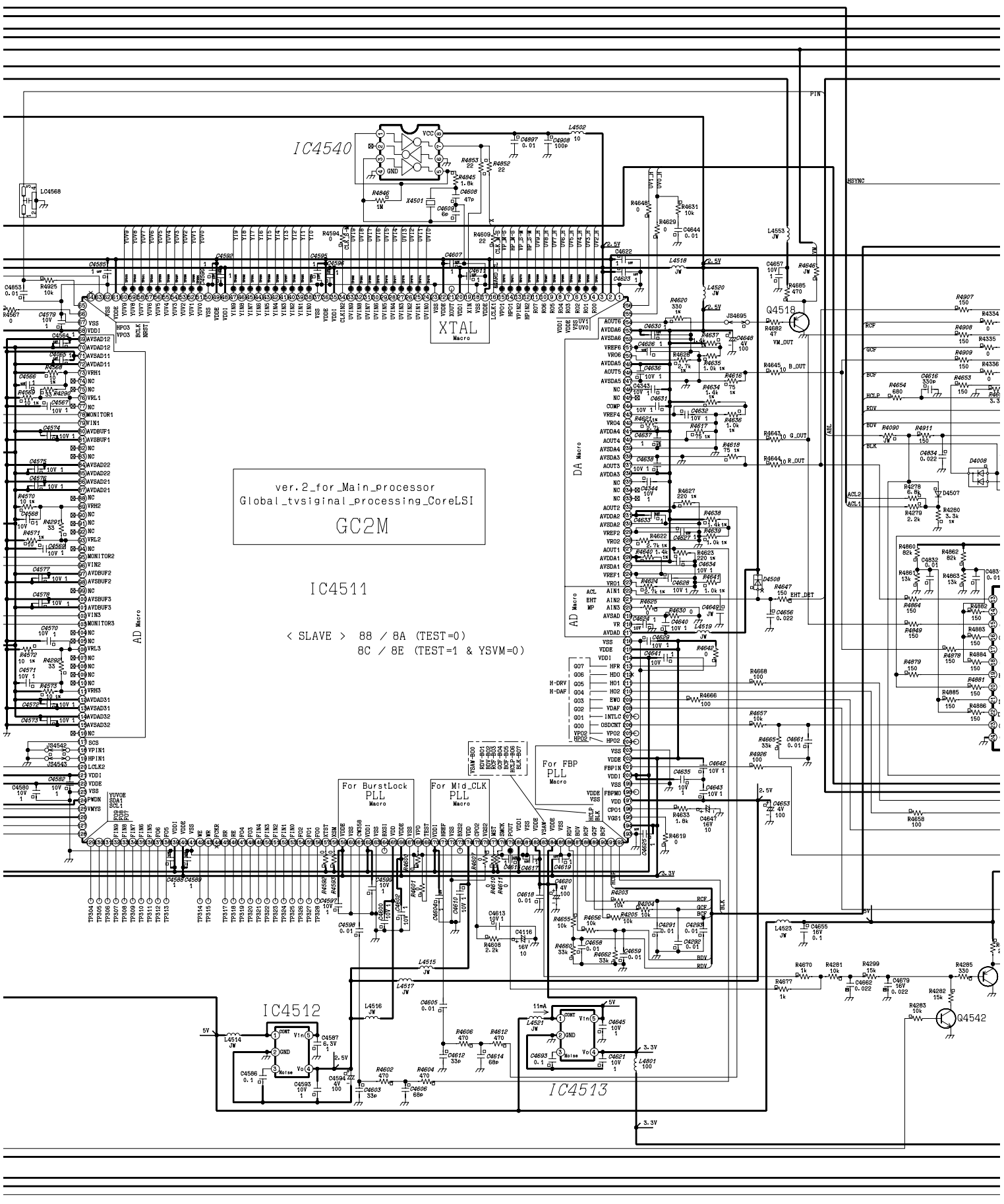
1	2	3	4	5	6	7	8

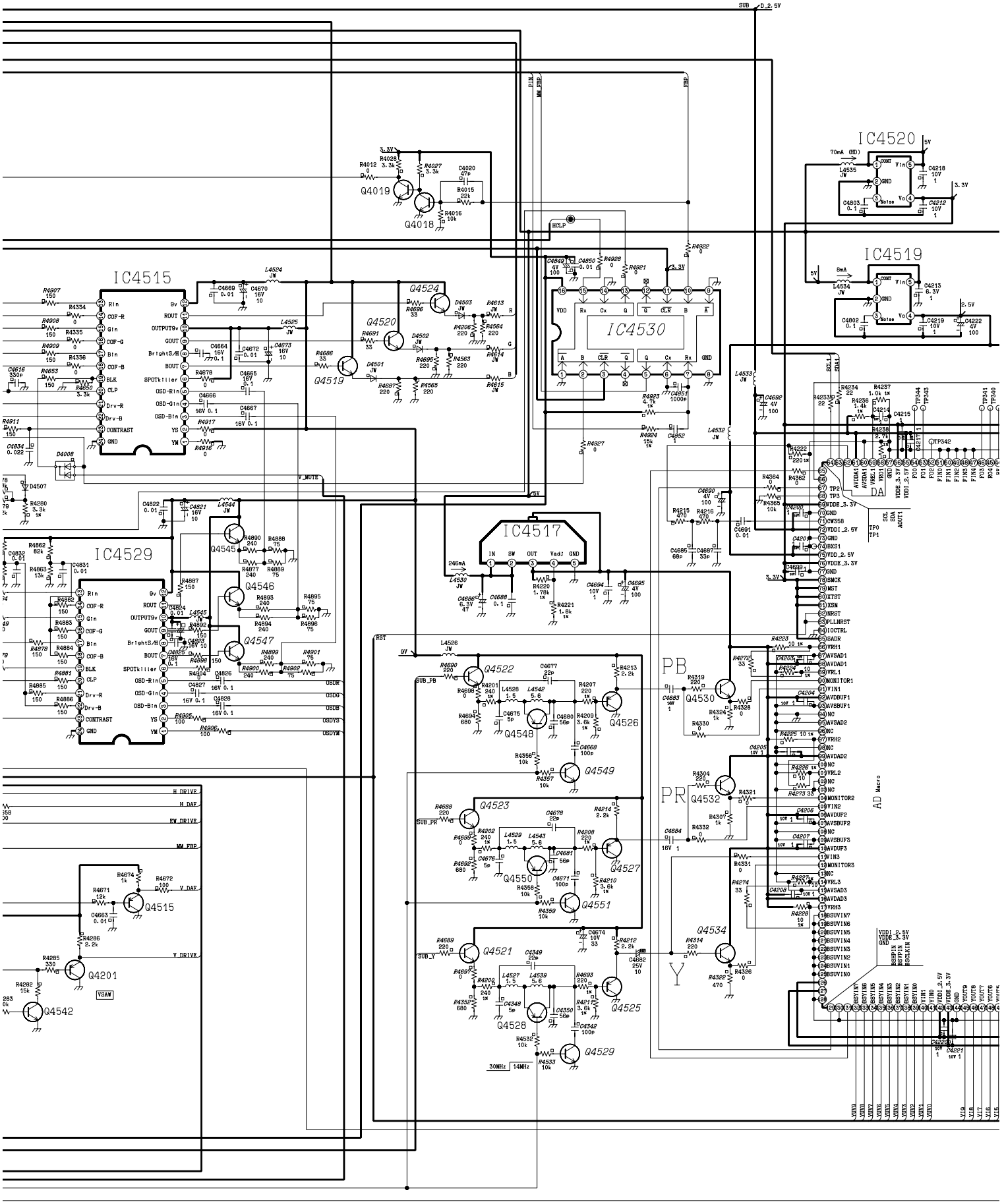


J I H G F E D C B A

1 2 3 4 5 6 7 8

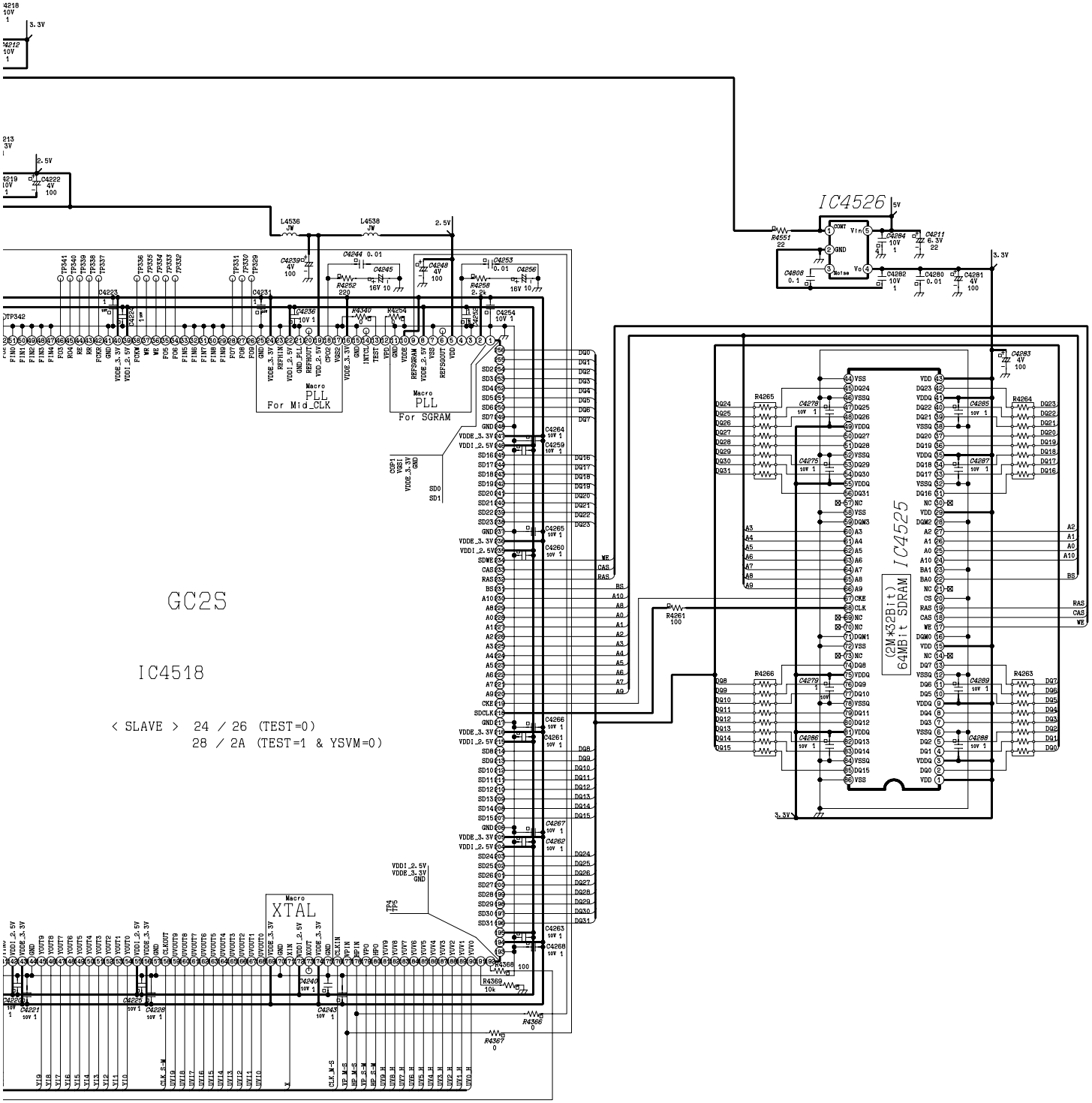

CATEGORY OF GND
NONE = MAIN GND
1 = GC2M_AD
2 = GC2S_AD
3 = GC2M_FIFO
4 = GC2S_SDRAM
6 = HD_AD
IC4509
IC4504
IC4508
PB
PR
Y
Q4001
Q4002
Q4005
Q4006
Q4007
Q4008
Q4009
Q4010
Q4011
Q4012
Q4013
Q4501
Q4502
Q4503
Q4504
Q4505
Q4506
Q4507
Q4536
Q4538
Q4540
Q4541
MAIN_Y
MAIN_PB
MAIN_PR
SUB_Y
IIC
TILT
V_PASTER
H_PASTER
LANDING
AC SW
AUDIO MUTE
SERVICE SW
HD_SD SW
SOS LED
VIDEO_MUTE


IC4540
XTAL
Macro
ver.2_for_Main_processor
Global_tvsiginal_processing_CoreLSI
GC2M
IC4511
< SLAVE > 88 / 8A (TEST=0)
8C / 8E (TEST=1 & YSVM=0)
AD Macro
DA Macro
For BurstLock PLL Macro
For Mid_CLK PLL Macro
For FBP PLL Macro
IC4512
IC4513
Q4518
Q4542
HSYNC
VM_OUT
B_OUT
G_OUT
R_OUT
EHT_DET

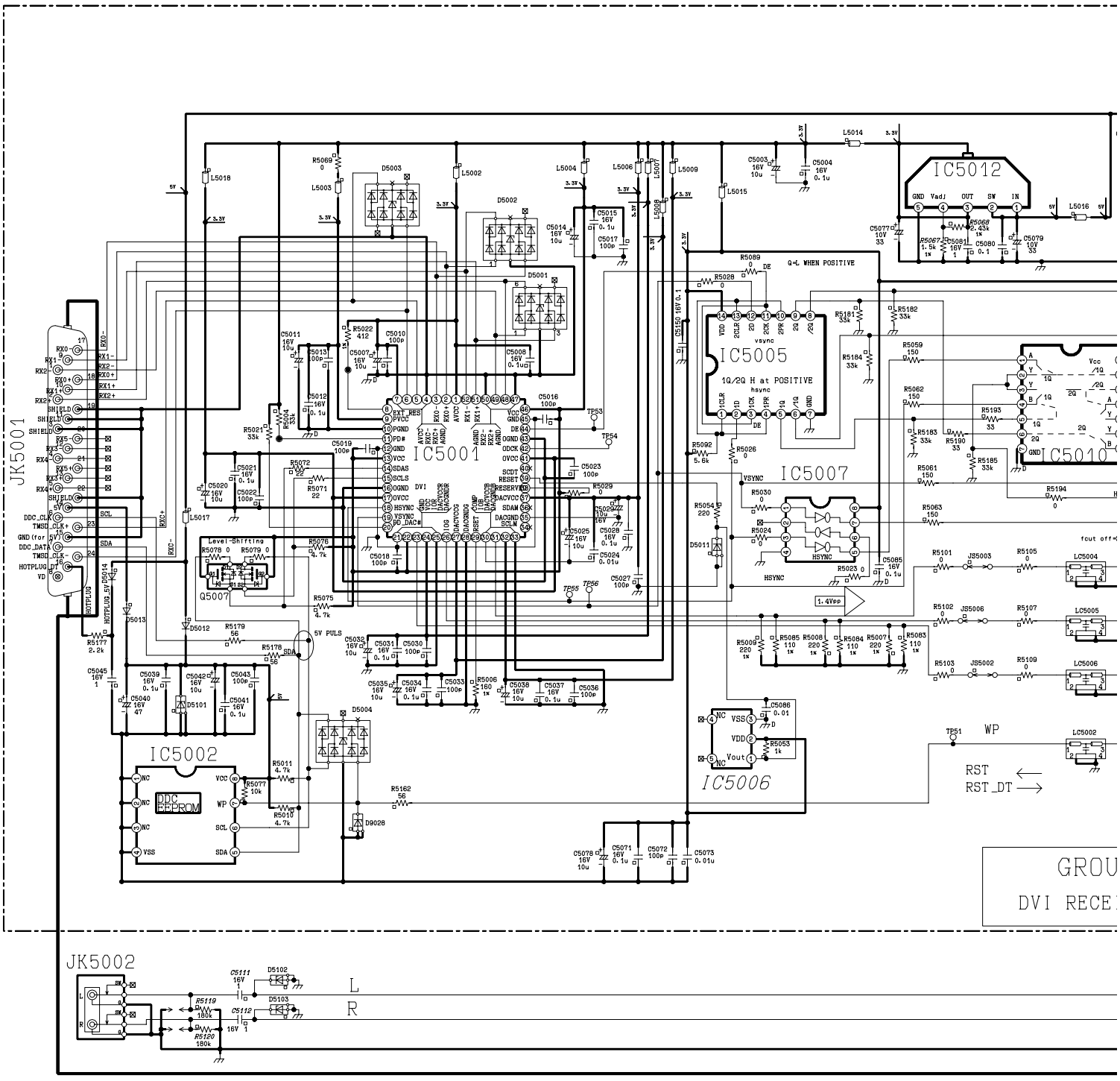

IC4515
IC4520
IC4519
IC4530
IC4517
IC4529
Q4524
Q4520
Q4519
Q4546
Q4545
Q4547
Q4522
Q4548
Q4526
Q4549
Q4523
Q4550
Q4527
Q4551
Q4521
Q4528
Q4525
Q4529
Q4019
Q4018
Q4530
Q4532
Q4534
Q4515
Q4201
Q4542
PB
PR
Y
DA
AD Macro
SUB
D_2.5V
HCLP
V_MUTE
RST
H DRIVE
H DAF
EW DRIVE
MW FBP
V DAF
V DRIVE
VSAW
30MHz
14MHz

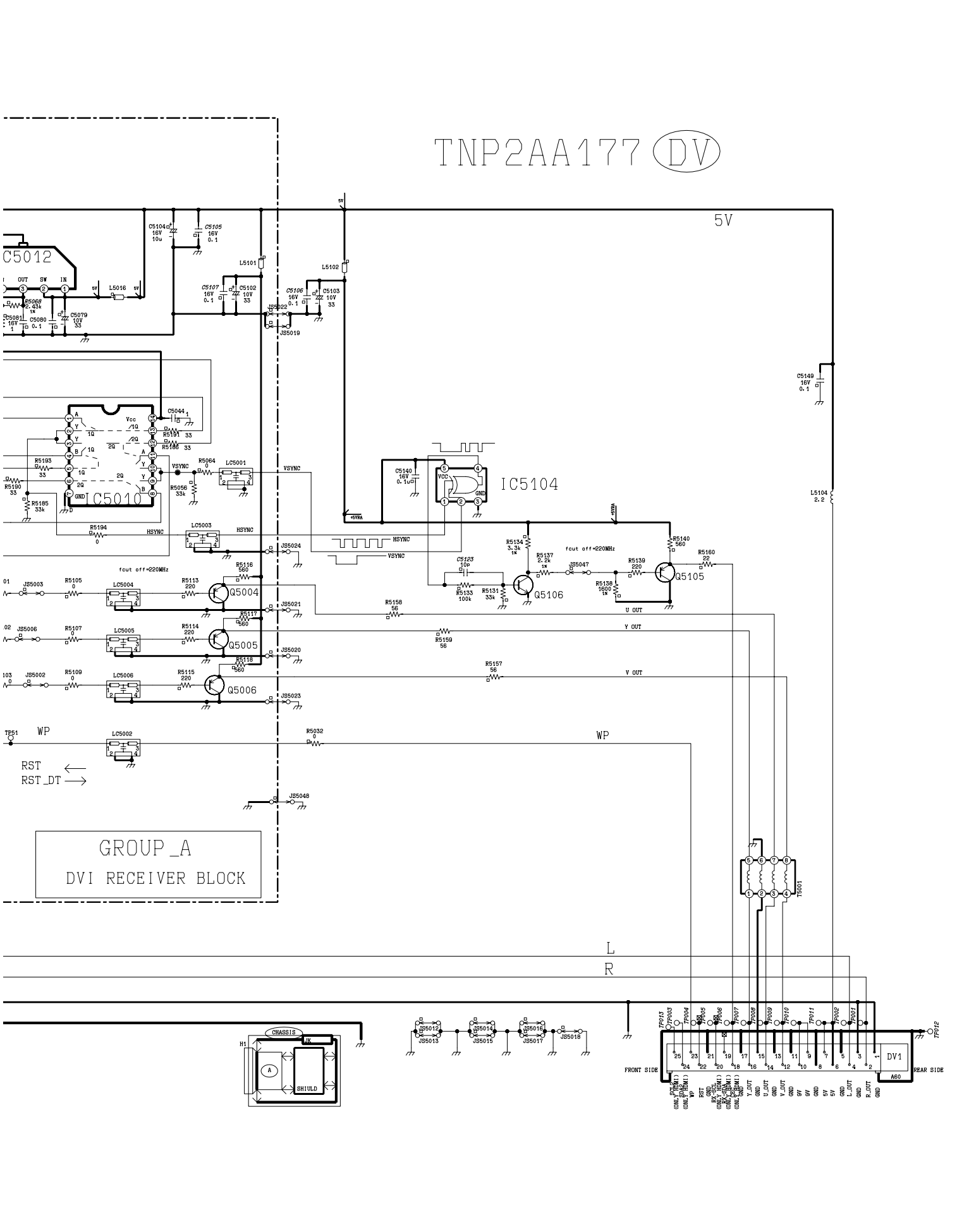
1	2	3	4	5	6	7	8

TNP2AA176 DG

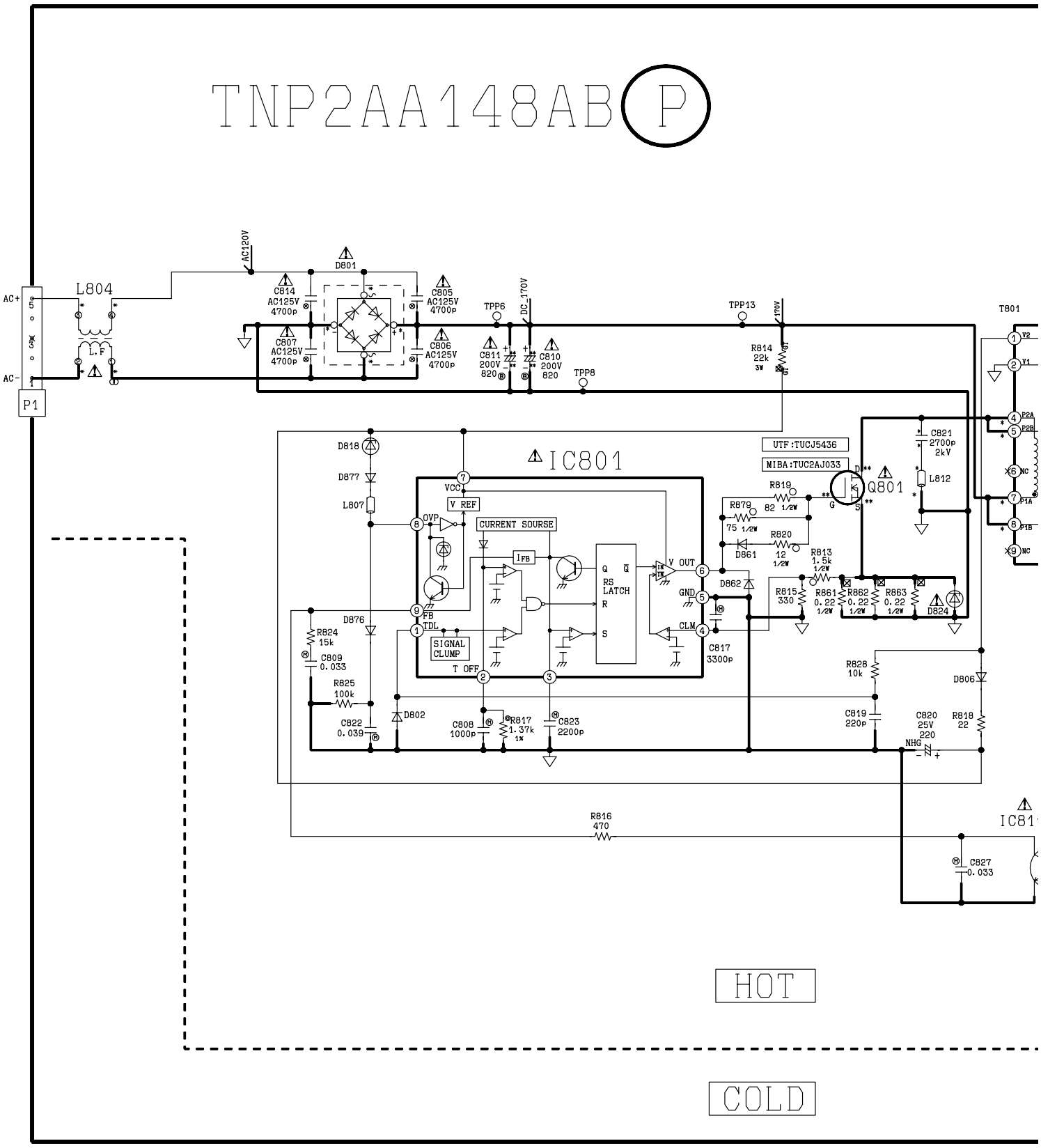


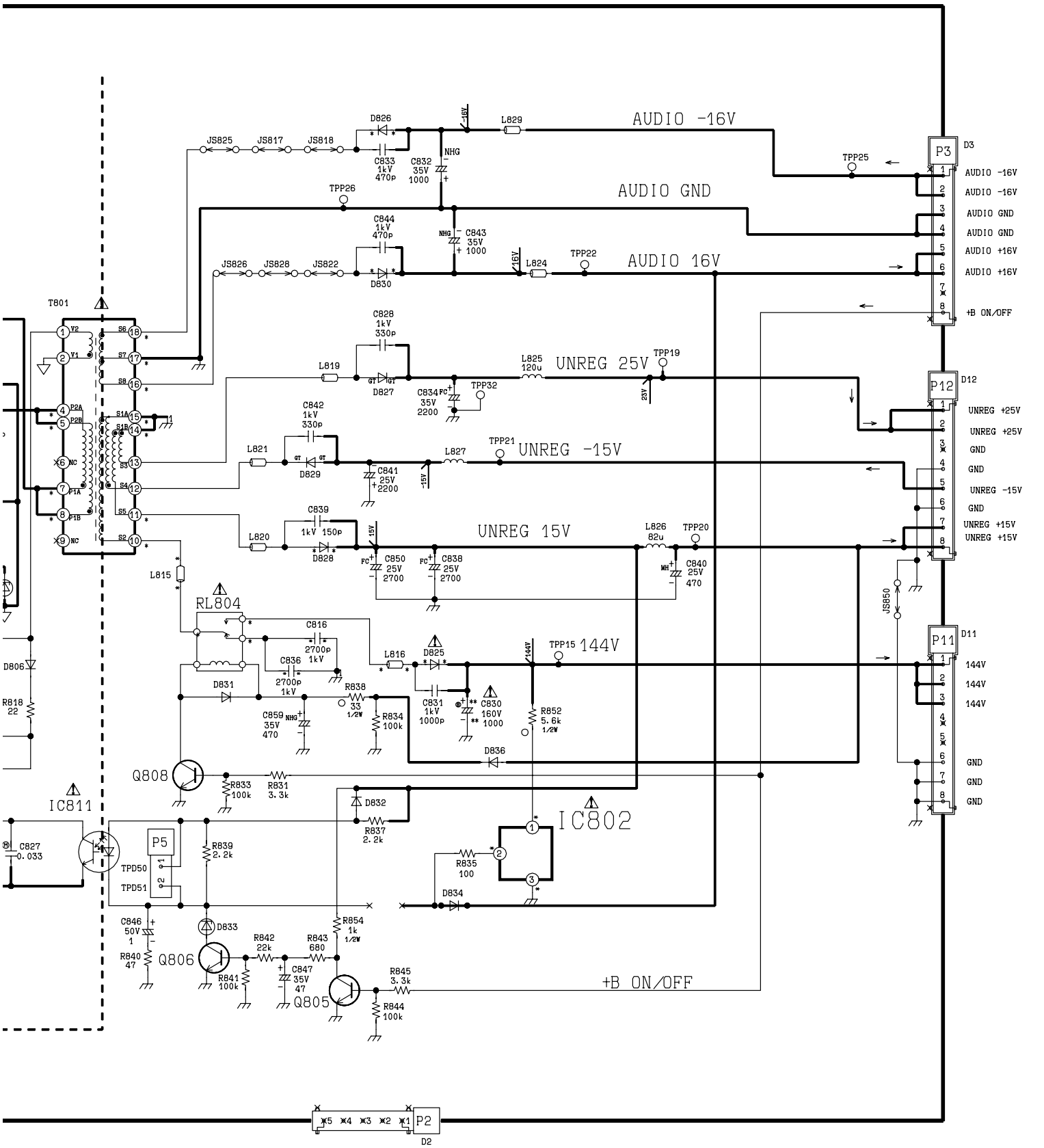
1	2	3	4	5	6	7	8


JK5001
IC5001
IC5002
DDC EEPROM
IC5005
IC5007
IC5012
IC5010
IC5006
Q5007
Level-Shifting
DVI
HSYNC
VSYNC
1.4Vpp
5V PULS
Q-L WHEN POSITIVE
1Q/2Q H at POSITIVE
RST
RST_DT
WP
JK5002
L
R
GROU
DVI RECE

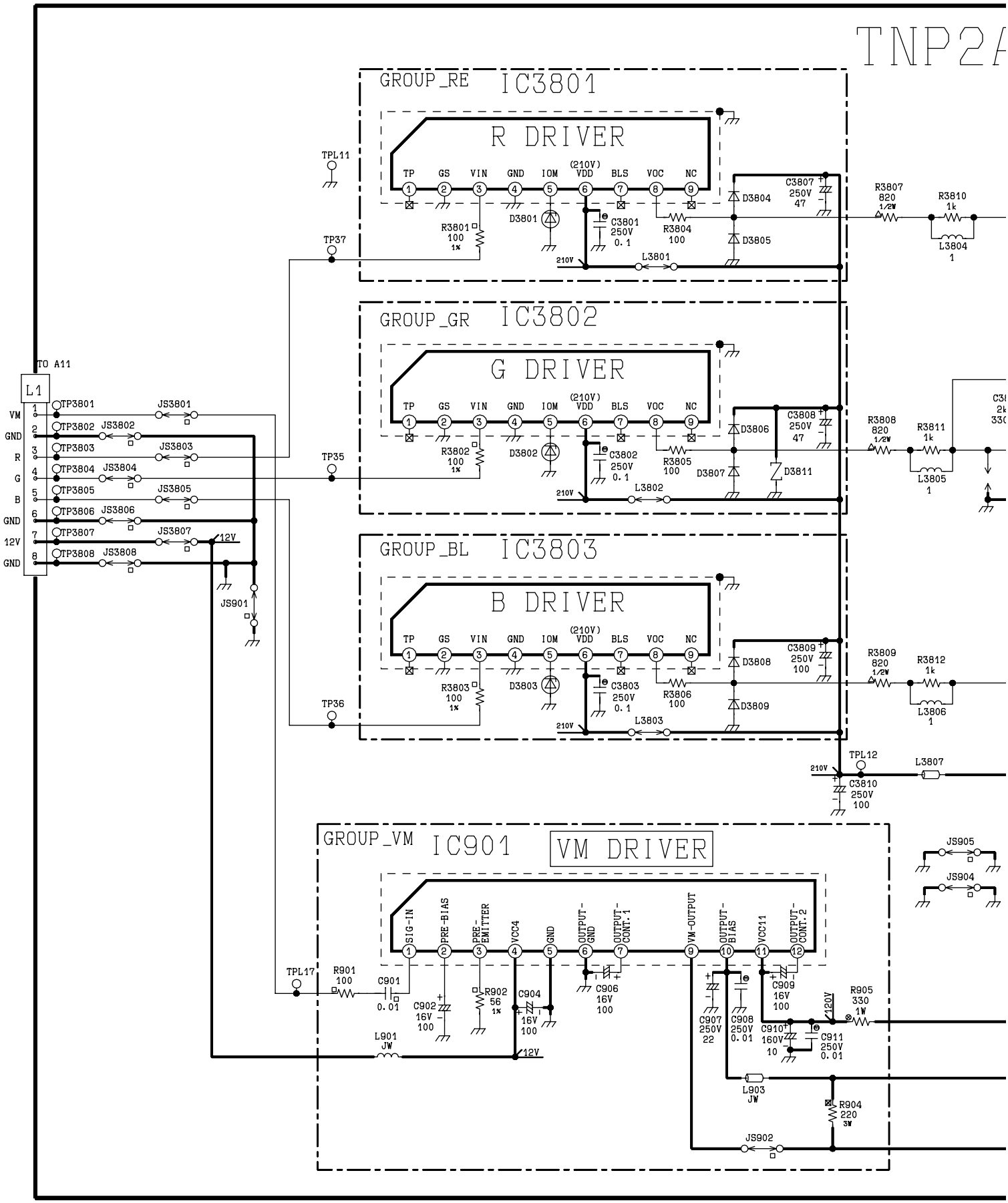

TNP2AA177 DV
5V
C5012
IC5010
IC5104
Q5004
Q5005
Q5006
Q5105
Q5106
LC5001
LC5002
LC5003
LC5004
LC5005
LC5006
VSYNC
HSYNC
WP
RST
RST_DT
U OUT
Y OUT
V OUT
L
R
GROUP_A
DVI RECEIVER BLOCK
CHASSIS
SHIULD
FRONT SIDE
REAR SIDE
DV1
A60

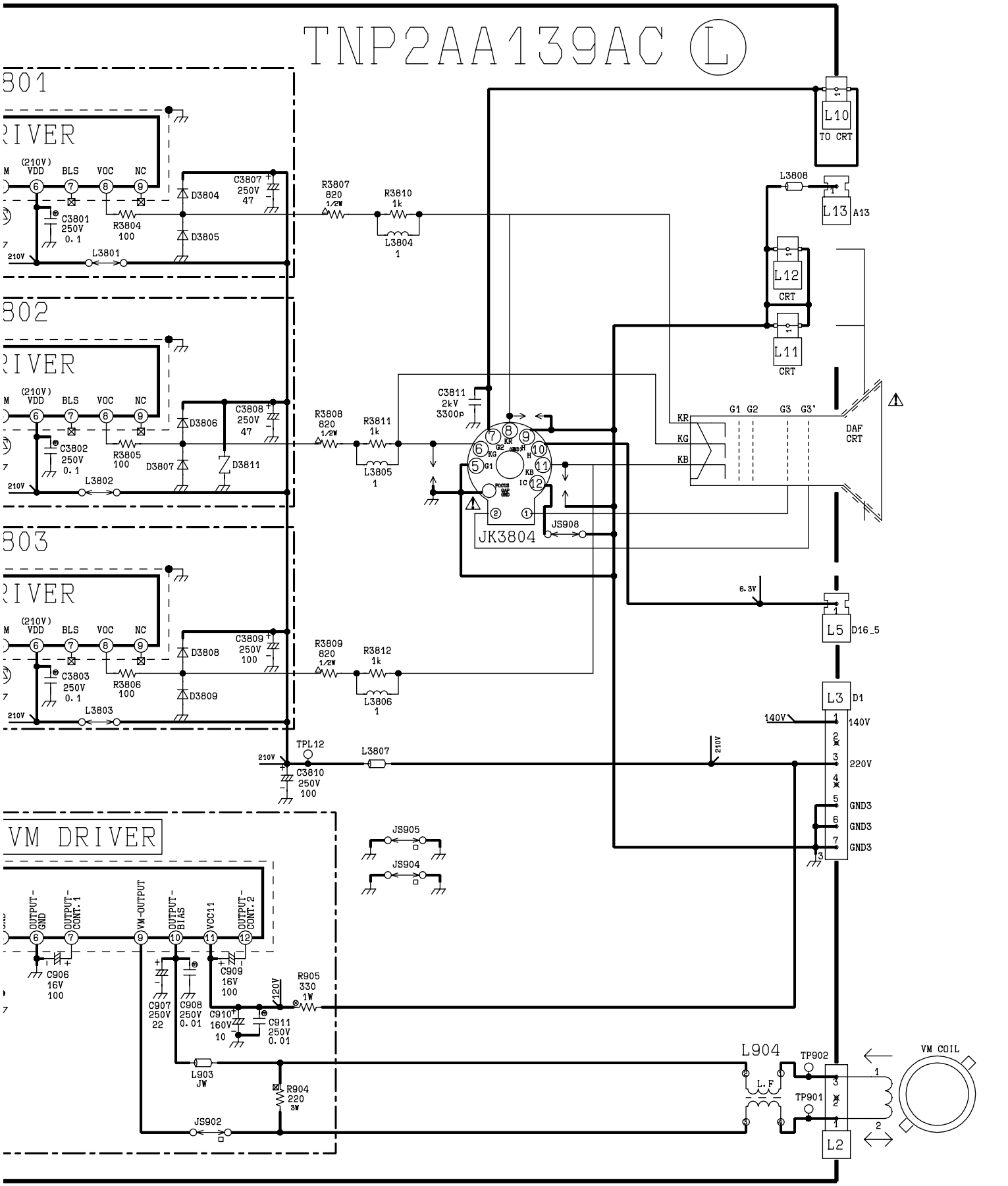
1	2	3	4	5	6	7	8

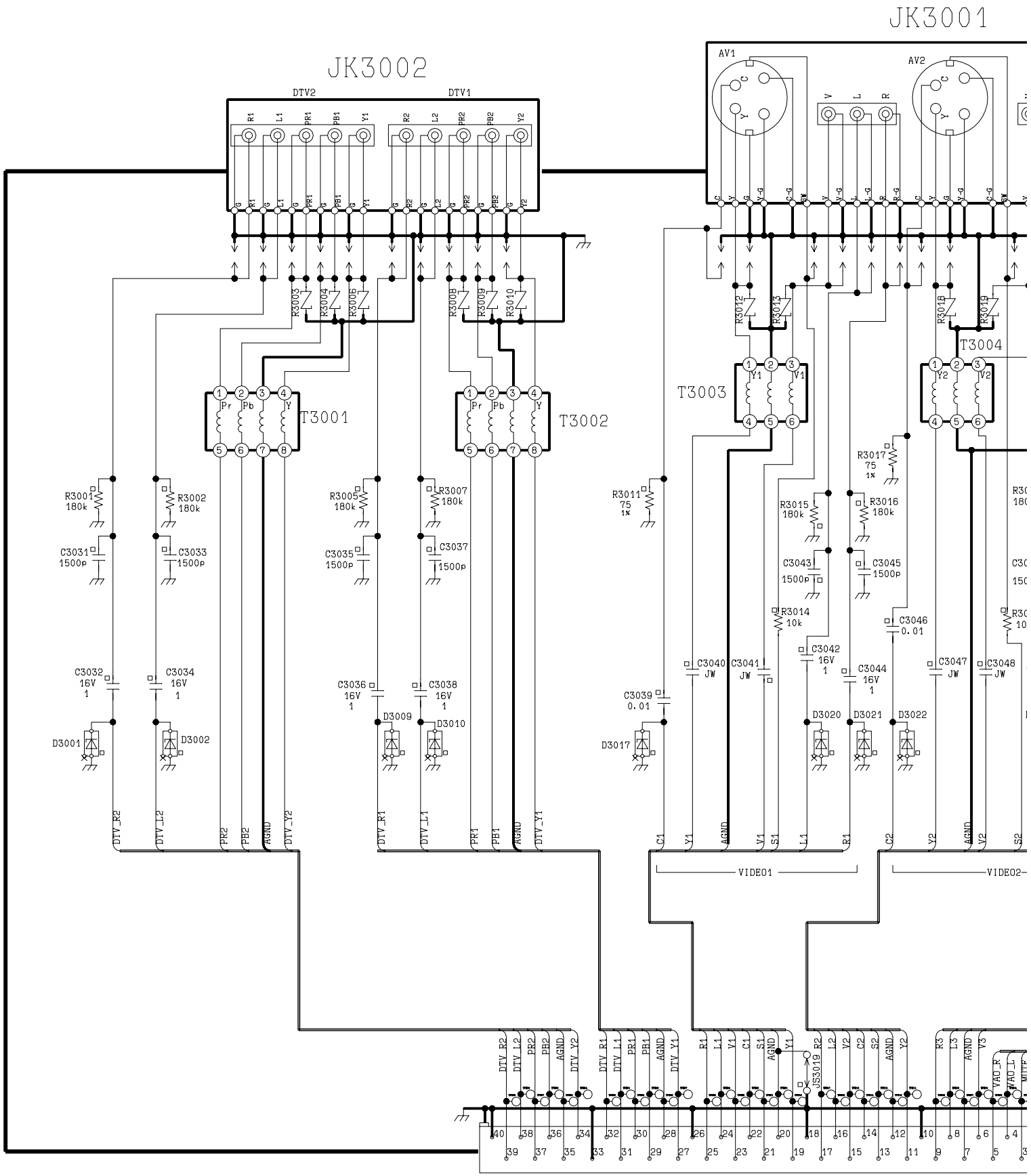

TNP2AA148AB P
AC120V
D801
L804
AC+
AC-
P1
L.F
C814 AC125V 4700p
C807 AC125V 4700p
C805 AC125V 4700p
C806 AC125V 4700p
TPP6
DC_170V
C811 200V 820
C810 200V 820
TPP8
TPP13
170V
R814 22k 3W
T801
V2
V1
P2A
P2B
NC
P1A
P1B
NC
IC801
D818
D877
L807
VCC
V REF
OVP
CURRENT SOURSE
IFB
RS LATCH
V OUT
GND
CLM
FB
TDL
SIGNAL CLUMP
T OFF
D876
R824 15k
C809 0.033
R825 100k
C822 0.039
D802
C808 1000p
R817 1.37k 1%
C823 2200p
C817 3300p
UTF:TUCJ5436
MIBA:TUCJ2AJ033
Q801
R819 82 1/2W
R879 75 1/2W
R820 12 1/2W
D861
D862
R813 1.5k 1/2W
R815 330
R861 0.22 1/2W
R862 0.22 1/2W
R863 0.22 1/2W
D824
C821 2700p 2kV
L812
R828 10k
D806
C819 220p
C820 25V 220
NHG
R818 22
R816 470
IC81
C827 0.033
HOT
COLD



P-BOARD 2/2 TNP2AA148AB CT-32HC14J/UJ

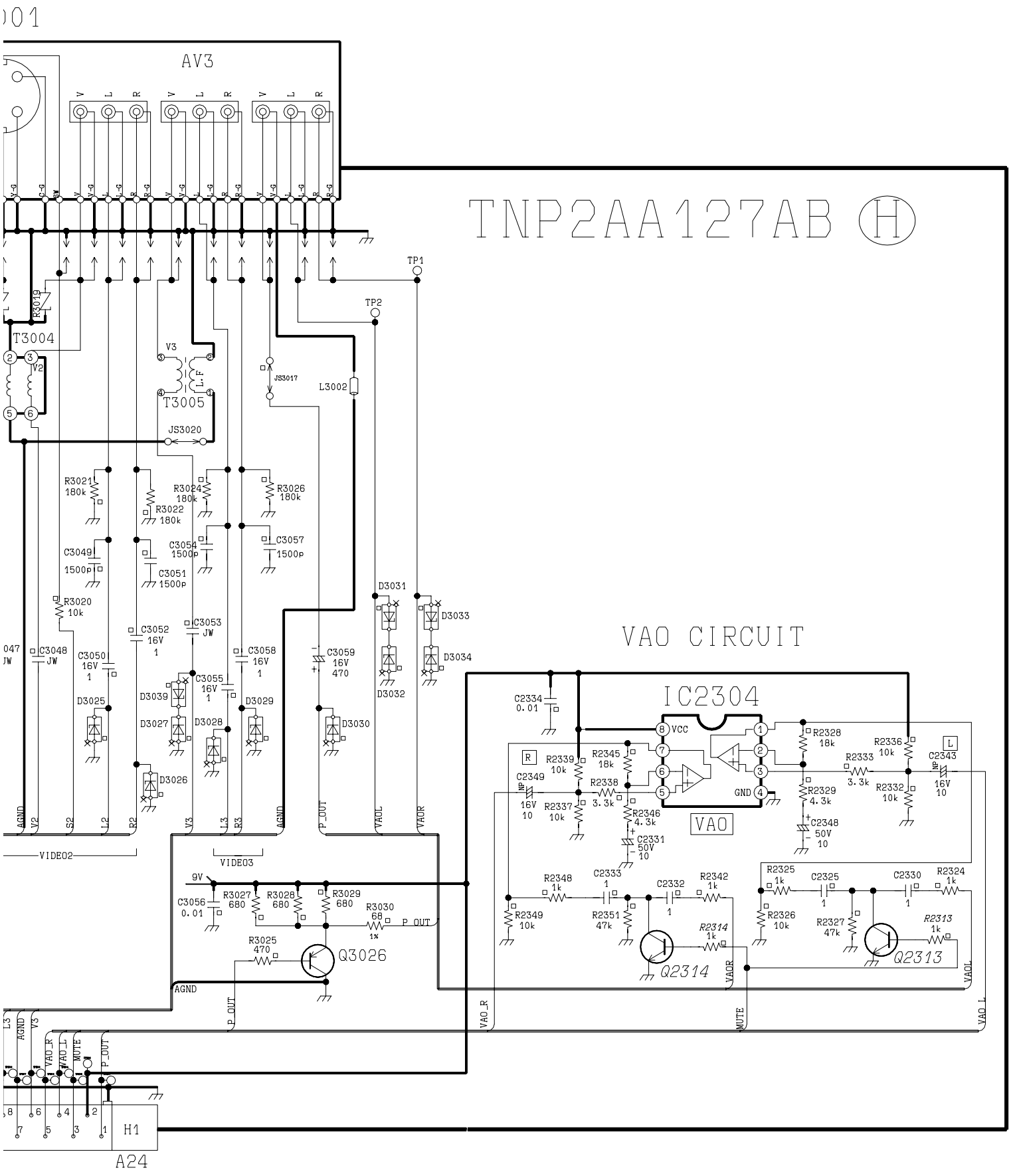

TNP2A
GROUP_RE IC3801
R DRIVER
TP GS VIN GND IOM (210V) VDD BLS VOC NC
GROUP_GR IC3802
G DRIVER
GROUP_BL IC3803
B DRIVER
GROUP_VM IC901 VM DRIVER
SIG-IN PRE-BIAS PRE-EMITTER VCC4 GND OUTPUT-GND OUTPUT-CONT.1 VM-OUTPUT OUTPUT-BIAS VCC11 OUTPUT-CONT.2
TO A11
L1
VM GND R G B GND 12V GND
TP3801 TP3802 TP3803 TP3804 TP3805 TP3806 TP3807 TP3808
JS3801 JS3802 JS3803 JS3804 JS3805 JS3806 JS3807 JS3808
JS901 JS902 JS904 JS905
TPL11 TPL12 TPL17
TP37 TP35 TP36
R3801 100 1%
R3802 100 1%
R3803 100 1%
R3804 100
R3805 100
R3806 100
R3807 820 1/2W
R3808 820 1/2W
R3809 820 1/2W
R3810 1k
R3811 1k
R3812 1k
D3801 D3802 D3803 D3804 D3805 D3806 D3807 D3808 D3809 D3811
C3801 250V 0.1
C3802 250V 0.1
C3803 250V 0.1
C3807 250V 47
C3808 250V 47
C3809 250V 100
C3810 250V 100
L3801 L3802 L3803 L3804 1 L3805 1 L3806 1 L3807
210V
R901 100
C901 0.01
C902 16V 100
R902 56 1%
C904 16V 100
L901 JW
C906 16V 100
C907 250V 22
C908 250V 0.01
C909 16V 100
C910 160V 10
C911 250V 0.01
120V
R905 330 1W
L903 JW
R904 220 3W

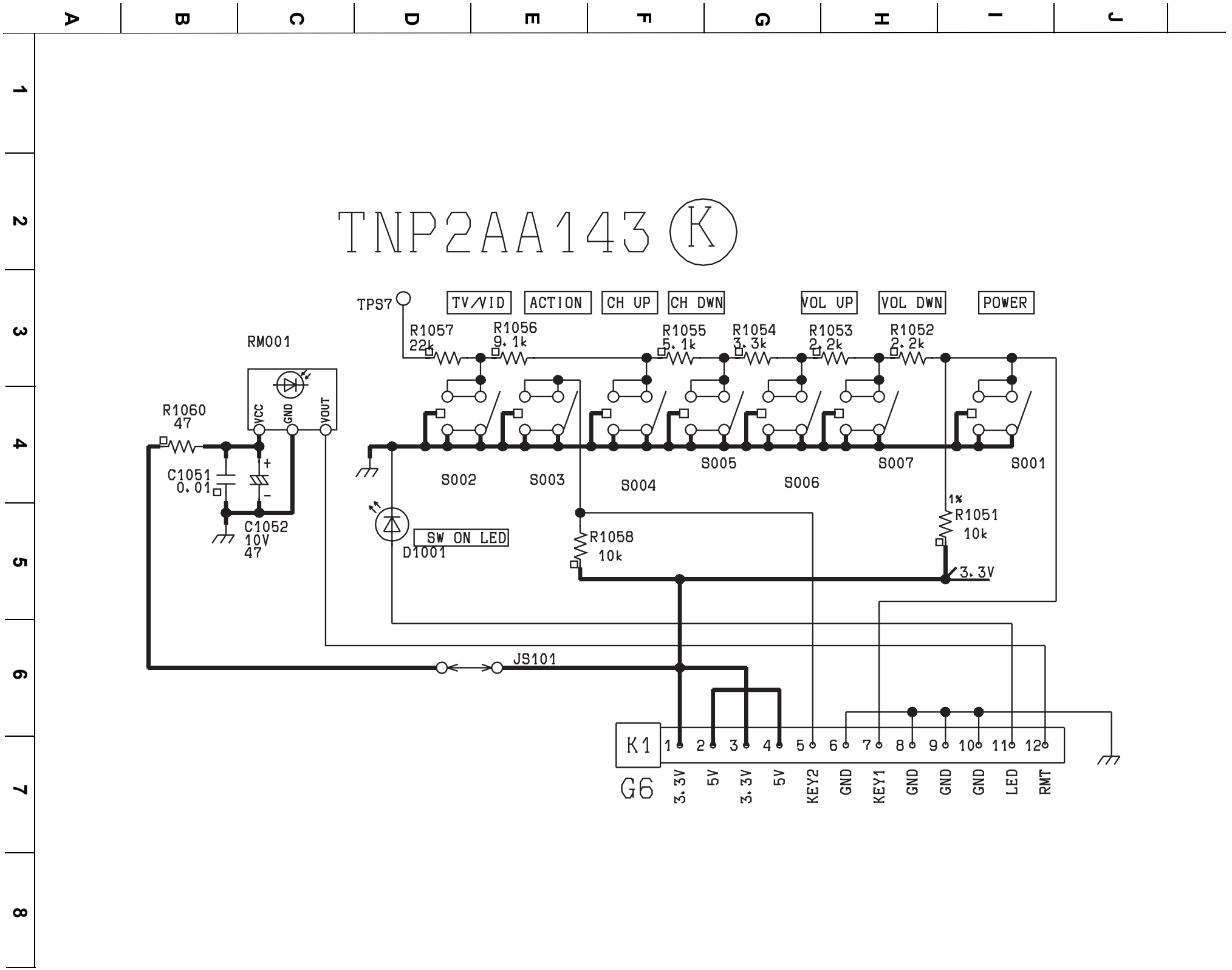

TNP2AA139AC (L)
VM DRIVER
(210V)
VDD
BLS
VOC
NC
C3801 250V 0.1
C3802 250V 0.1
C3803 250V 0.1
R3804 100
R3805 100
R3806 100
D3804
D3805
D3806
D3807
D3808
D3809
D3811
C3807 250V 47
C3808 250V 47
C3809 250V 100
R3807 820 1/2W
R3808 820 1/2W
R3809 820 1/2W
R3810 1k
R3811 1k
R3812 1k
L3801
L3802
L3803
L3804 1
L3805 1
L3806 1
C3811 2kV 3300p
JK3804
JS908
KR
KG
KB
G1 G2 G3 G3'
DAF CRT
L10 TO CRT
L11 CRT
L12 CRT
L13 A13
L3808
6.3V
L5 D16_5
L3 D1
140V
220V
GND3
TPL12
L3807
C3810 250V 100
JS905
JS904
OUTPUT-GND
OUTPUT-CONT.1
VM-OUTPUT
OUTPUT-BIAS
VCC11
OUTPUT-CONT.2
C906 16V 100
C907 250V 22
C908 250V 0.01
C909 16V 100
C910 160V 10
C911 250V 0.01
120V
R905 330 1W
L903 JW
R904 220 3W
JS902
L904
L.F
TP902
TP901
VM COIL
L2

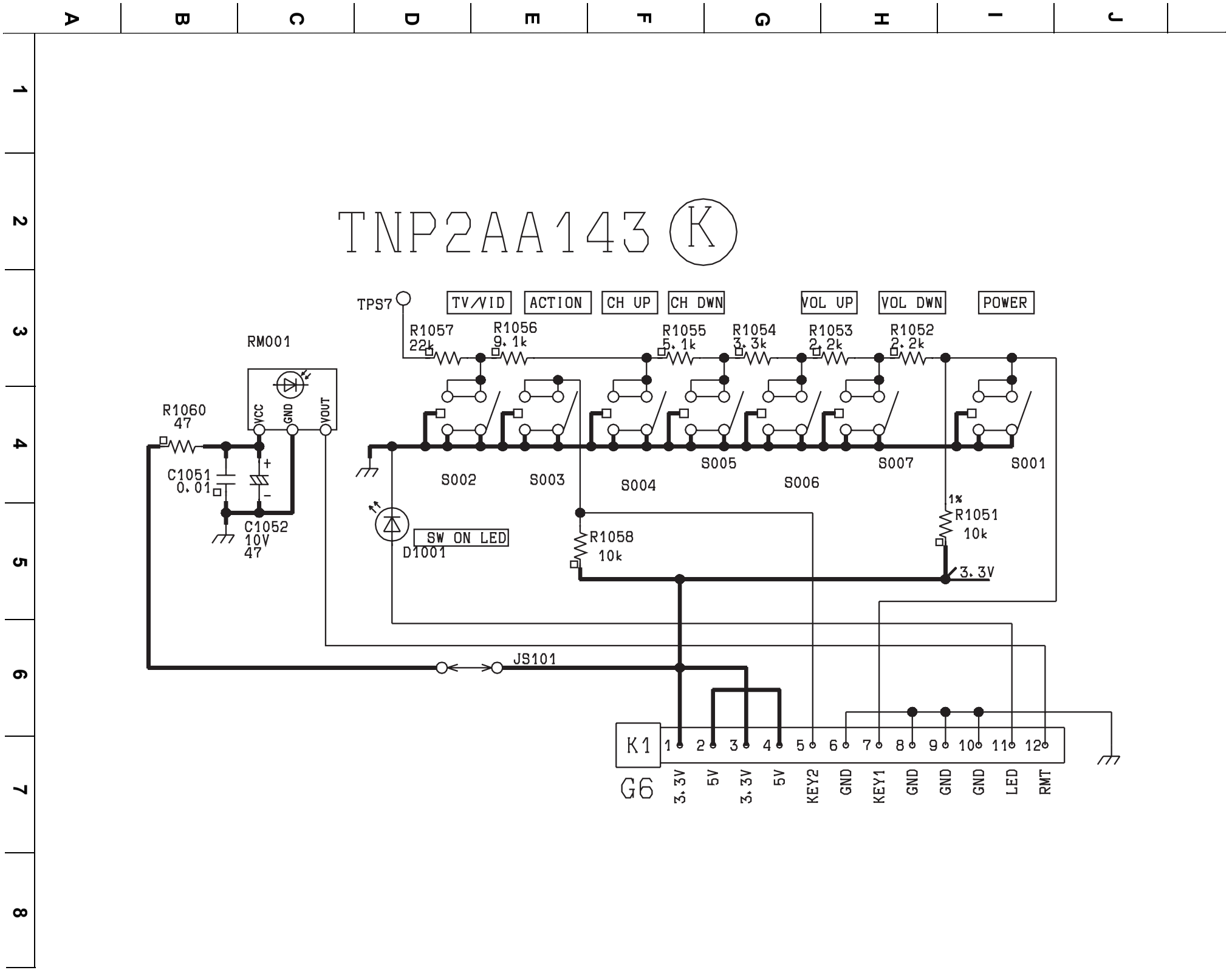


1	2	3	4	5	6	7	8

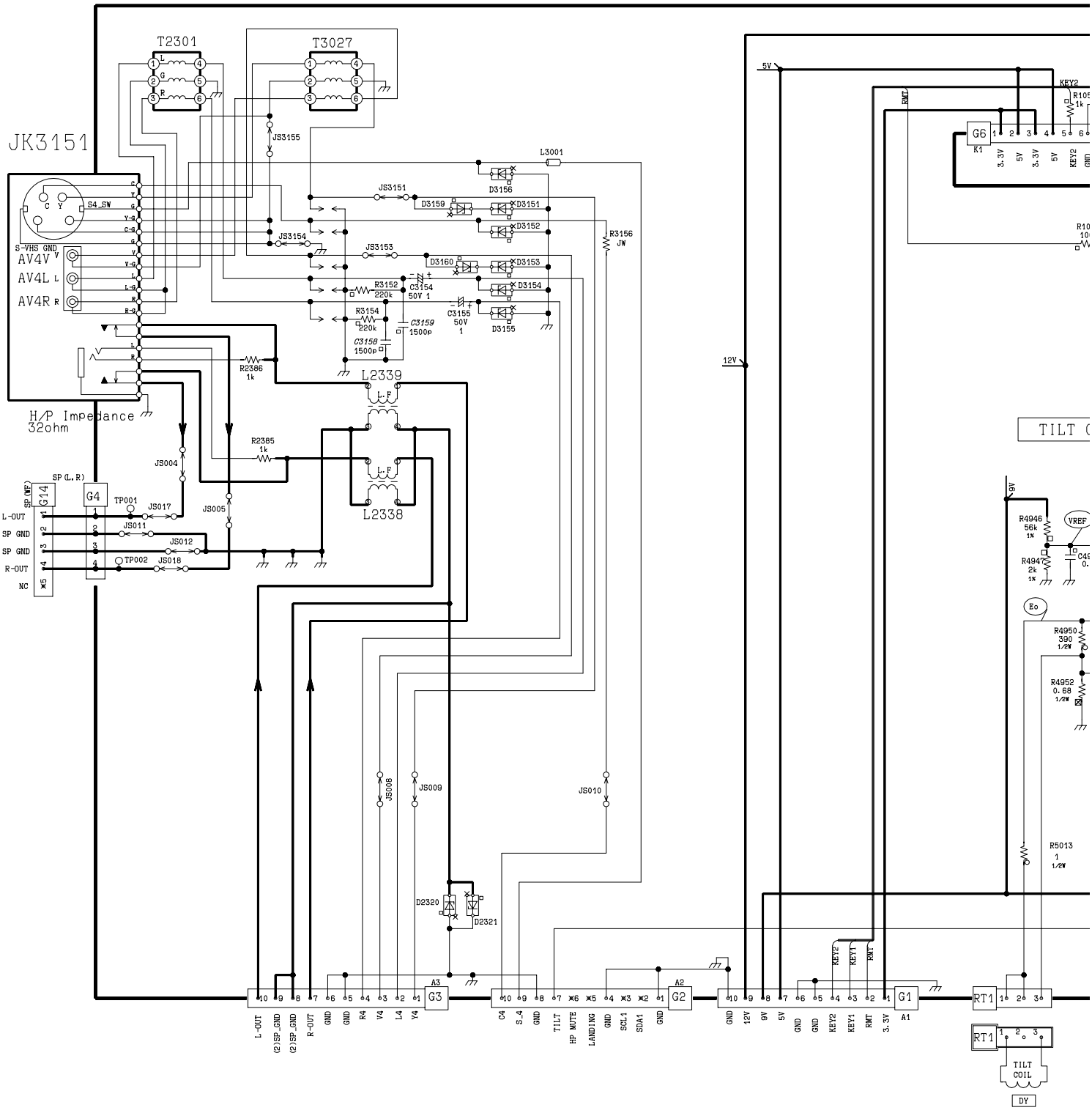
H-BOARD 1/2 TNP2AA127AB CT-32HC14J/UJ

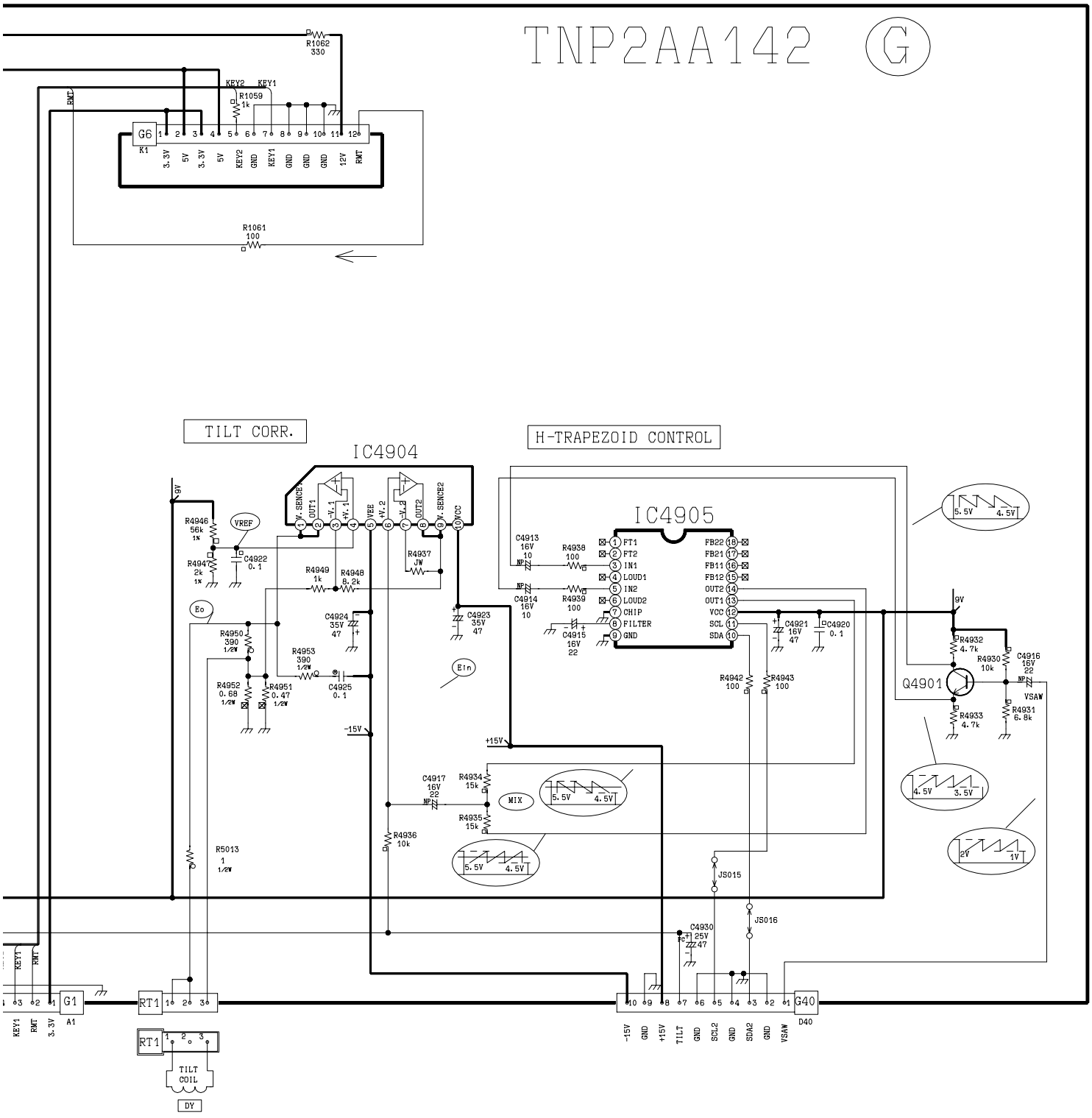

TNP2AA127AB H
AV3
V
L
R
TP1
TP2
T3004
T3005
V3
V2
L.F.
JS3017
JS3020
L3002
R3019
R3021 180k
R3022 180k
R3024 180k
R3026 180k
R3020 10k
C3049 1500p
C3051 1500p
C3054 1500p
C3057 1500p
C3048 JW
C3050 16V 1
C3052 16V 1
C3053 JW
C3055 16V 1
C3058 16V 1
C3059 16V 470
D3025
D3026
D3027
D3028
D3029
D3030
D3031
D3032
D3033
D3034
D3039
AGND
V2
S2
L2
R2
V3
L3
R3
P_OUT
VAOL
VAOR
VIDEO2
VIDEO3
9V
C3056 0.01
R3027 680
R3028 680
R3029 680
R3030 68
1%
R3025 470
Q3026
VAO CIRCUIT
IC2304
VCC
GND
VAO
C2334 0.01
R2328 18k
R2336 10k
R2333 3.3k
R2332 10k
R2329 4.3k
C2343 NP 16V 10
C2348 50V 10
R2339 10k
R2345 18k
R2338 3.3k
R2346 4.3k
C2349 NP 16V 10
R2337 10k
C2331 50V 10
C2333 1
R2348 1k
R2349 10k
R2351 47k
C2332 1
R2342 1k
R2314 1k
Q2314
R2325 1k
C2325 1
R2326 10k
C2330 1
R2324 1k
R2327 47k
R2313 1k
Q2313
VAO_R
VAO_L
MUTE
P_OUT
H1
A24


TNP2AA143 K
TPS7
TV/VID
ACTION
CH UP
CH DWN
VOL UP
VOL DWN
POWER
R1057 22k
R1056 9.1k
R1055 5.1k
R1054 3.3k
R1053 2.2k
R1052 2.2k
RM001
VCC
GND
VOUT
R1060 47
C1051 0.01
C1052 10V 47
S002
S003
S004
S005
S006
S007
S001
SW ON LED
D1001
R1058 10k
1%
R1051 10k
3.3V
JS101
K1
G6
1 2 3 4 5 6 7 8 9 10 11 12
3.3V
5V
3.3V
5V
KEY2
GND
KEY1
GND
GND
GND
LED
RMT
A B C D E F G H I J
1 2 3 4 5 6 7 8
K-BOARD TNP2AA143 CT-32HC14J/UJ



K-BOARD TNP2AA143 CT-32HC14J/UJ


T2301
T3027
JK3151
JS3155
L3001
D3156
JS3151
D3159
D3151
D3152
JS3154
JS3153
R3156
JW
D3160
D3153
D3154
R3152
220k
C3154
50V 1
R3154
220k
C3155
50V
1
D3155
C3159
1500p
C3158
1500p
S-VHS GND
AV4V
AV4L
AV4R
S4_SW
R2386
1k
L2339
L.F
H/P Impedance
32ohm
R2385
1k
L2338
JS004
JS005
SP (L,R)
SP (WF)
G14
G4
TP001
TP002
JS017
JS011
JS012
JS018
L-OUT
SP GND
SP GND
R-OUT
NC
JS008
JS009
JS010
D2320
D2321
5V
12V
9V
KEY2
R105
1k
RMT
G6
K1
3.3V
5V
3.3V
5V
KEY2
GND
TILT (
R4946
56k
1%
R4947
2k
1%
VREF
Eo
R4950
390
1/2W
R4952
0.68
1/2W
R5013
1
1/2W
A3
G3
L-OUT
(2)SP_GND
(2)SP_GND
R-OUT
GND
GND
R4
V4
L4
Y4
A2
G2
C4
S_4
GND
TILT
HP MUTE
LANDING
GND
SCL1
SDA1
GND
GND
12V
9V
5V
GND
GND
KEY2
KEY1
RMT
3.3V
A1
G1
RT1
RT1
TILT
COIL
DY


TNP2AA142
G
TILT CORR.
IC4904
H-TRAPEZOID CONTROL
IC4905
R1062
330
KEY2
KEY1
R1059
1k
RMT
G6
K1
3.3V
5V
3.3V
5V
KEY2
GND
KEY1
GND
GND
GND
12V
RMT
R1061
100
9V
R4946
56k
1%
R4947
2k
1%
VREF
C4922
0.1
R4949
1k
R4948
6.2k
R4937
JW
C4923
35V
47
C4924
35V
47
Eo
R4950
390
1/2W
R4953
390
1/2W
C4925
0.1
R4952
0.68
1/2W
R4951
0.47
1/2W
-15V
+15V
Ein
R5013
1
1/2W
C4917
16V
22
R4934
15k
R4935
15k
MIX
R4936
10k
C4913
16V
10
R4938
100
C4914
16V
10
R4939
100
C4915
16V
22
FT1
FT2
IN1
LOUD1
IN2
LOUD2
CHIP
FILTER
GND
FB22
FB21
FB11
FB12
OUT2
OUT1
VCC
SCL
SDA
C4921
16V
47
C4920
0.1
R4942
100
R4943
100
Q4901
R4932
4.7k
R4930
10k
C4916
16V
22
R4933
4.7k
R4931
6.8k
VSAW
5.5V
4.5V
4.5V
3.5V
2V
1V
JS015
JS016
C4930
25V
47
KEY1
RMT
3.3V
G1
A1
RT1
TILT
COIL
DY
-15V
GND
+15V
TILT
GND
SCL2
GND
SDA2
GND
VSAW
G40
D40

A-BOARD - TNP2AH063

IC3002

1	5.22	41	4.58
2	4.90	42	0.00
3	4.90	43	4.56
4	0.00	44	4.56
5	4.74	45	0.00
6	0.00	46	4.57
7	4.76	47	9.14
8	5.10	48	4.79
9	4.76	49	0.00
10	0.39	50	4.78
11	4.56	51	5.10
12	4.56	52	4.78
13	0.00	53	0.45
14	4.76	54	4.56
15	0.00	55	4.56
16	4.77	56	0.00
17	5.09	57	4.76
18	4.77	58	0.00
19	0.40	59	4.75
20	4.56	60	5.10
21	4.56	61	4.76
22	0.00	62	0.48
23	4.59	63	0.00
24	4.59	64	4.56
25	0.00	65	0.00
26	4.62	66	0.00
27	4.63	67	4.74
28	0.00	68	0.00
29	0.00	69	0.00
30	4.62	70	4.56
31	9.14	71	4.56
32	4.60	72	0.00
33	4.60	73	0.00
34	0.00	74	4.76
35	4.55	75	4.76
36	4.55	76	4.75
37	0.00	77	0.00
38	4.56	78	4.56
39	4.56	79	4.56
40	4.56	80	0.00

IC3003

1	4.00	33	4.80
2	4.56	34	4.80
3	4.00	35	0.00
4	4.56	36	0.00
5	4.52	37	4.43
6	0.15	38	4.58
7	5.00	39	4.30
8	4.00	40	4.58
9	4.56	41	4.58
10	4.30	42	9.17
11	4.56	43	4.51
12	4.51	44	0.00
13	0.16	45	5.00
14	5.10	46	0.00
15	4.00	47	0.00
16	4.56	48	0.00
17	4.00	49	5.00
18	4.56	50	4.58
19	4.51	51	4.51
20	0.18	52	4.59
21	5.10	53	4.58
22	4.00	54	4.59
23	4.56	55	3.74
24	4.00	56	4.30
25	4.56	57	0.00
26	4.51	58	4.43
27	0.16	59	4.56
28	5.10	60	4.43
29	0.00	61	4.56
30	0.00	62	4.56
31	0.00	63	4.22
32	0.00	64	4.56

IC872

1	15.87
2	2.83
3	0.00
4	1.24
5	6.75

IC875

1	27.34
2	9.42
3	0.00
4	1.24
5	6.74

IC2451

1	4.57	16	9.18
2	4.63	17	4.78
3	4.62	18	0.00
4	4.58	19	3.97
5	4.58	20	3.97
6	4.62	21	4.57
7	4.62	22	4.63
8	4.62	23	4.62
9	1.38	24	4.62
10	4.62	25	4.62
11	1.67	26	4.60
12	1.67	27	4.60
13	4.90	28	4.60
14	4.90	29	4.63
15	0.00	30	4.57

IC2201

1	0.00	13	3.58
2	0.00	14	2.19
3	0.00	15	3.57
4	2.29	16	3.66
5	2.19	17	0.00
6	0.33	18	4.90
7	5.12	19	4.90
8	2.23	20	0.00
9	2.40	21	2.21
10	0.43	22	2.21
11	2.25	23	0.00
12	3.43	24	0.00

IC1004

1	0.00
2	0.00
3	0.00
4	0.00
5	2.17
6	0.00
7	0.00
8	3.32

IC871

1	15.87
2	5.41
3	0.00
4	1.24
5	6.77

IC2303

1	-10.33
2	0.00
3	0.00
4	-16.90
5	0.00
6	0.00
7	-10.34
8	10.44

IC2301

1	-10.33
2	-9.29
3	-5.20
4	-5.20
5	16.80
6	12.10
7	-0.11
8	-16.89
9	-3.97
10	-16.89
11	-0.14
12	12.20
13	16.80
14	-5.20
15	-3.97
16	-9.43
17	-10.34

IC4803

1	5.53
2	3.67
3	3.68
4	0.00
5	2.78
6	2.78
7	5.60
8	5.60
9	11.86

A-BOARD - TNP2AH063

	Q007	Q802	Q803	Q880	Q2301	Q2302
B	0.71	0.71	0.00	3.32	15.92	15.92
E	0.00	0.00	0.00	3.32	10.90	10.90
C	0.00	0.00	15.91	-1.13	0.27	-0.12

	Q2303	Q2304	Q2306	Q2307	Q2308	Q2310
B	0.00	0.00	-0.11	0.00	0.00	16.02
E	0.00	0.00	0.00	-0.30	2.68	0.00
C	0.00	15.92	5.18	0.00	0.00	9.75

	Q2311	Q2312	Q2317	Q2318	Q2336	Q2337
B	12.61	0.00	-0.53	-0.53	0.00	0.00
E	0.00	16.02	3.29	3.29	-0.13	-0.15
C	9.76	0.00	0.00	0.00	-0.14	15.91

	Q2338	Q2339	Q2340	Q2451	Q2452
B	0.00	0.00	0.00	4.60	4.60
E	0.00	-0.17	-0.18	3.97	3.96
C	-0.12	5.94	-1.12	9.18	9.18

D-BOARD - TNPH0466AG

IC451	
1	0.00
2	-16.35
3	0.00
4	15.55
5	1.30
6	1.30
7	16.00
8	-14.68
9	15.84
10	-14.67

IC500	
1	142.6
2	142.6
3	143.8
4	143.9
5	137.5
6	143.9
7	143.9
8	150.0
9	149.7
10	150.5

IC511	
1	3.76
2	3.22
3	3.23
4	0.00
5	0.00
6	0.00
7	0.36
8	11.87

IC751	
1	3.97
2	7.10
3	5.54
4	0.00
5	1.50
6	0.64
7	9.47
8	11.87

IC752	
1	11.87
2	3.97
3	0.00
4	0.00
5	0.00
6	29.66
7	33.52
8	42.00

IC876	
1	16.02
2	11.88
3	0.00
4	16.02

IC1501	
1	0.00
2	5.90
3	5.16
4	0.00
5	4.68
6	4.80
7	0.63
8	11.87

D-BOARD - TNPH0466AG

	Q404	Q405	Q406	Q503	Q509	Q510	Q512
B	0.69	16.00	0.60	0.00	43.20	48.91	5.74
E	0.00	16.40	0.00	0.00	48.70	48.23	5.82
C	0.16	0.00	0.00	11.86	143.40	143.40	11.87

	Q513	Q551	Q562	Q752	Q754	Q804	Q854
B	0.28	0.00	3.76	1.41	-0.44	27.51	143.50
E	0.00	0.00	3.22	0.82	0.00	27.81	143.80
C	5.74	-102.20	126.30	5.55	7.05	0.00	0.00

	Q860	Q861	Q862	Q1503	Q1504	Q1505	Q1506
B	0.00	0.61	-0.56	18.97	2.22	4.55	0.38
E	0.00	0.00	0.00	18.47	1.64	4.61	0.00
C	0.63	0.00	0.63	266.2	18.47	11.87	4.56

	Q502	Q751	Q755	Q1501	Q1502
G	11.87	9.46	33.50	4.62	11.87
D	0.00	0.00	33.10	62.60	0.00
S	0.00	0.00	29.70	0.00	0.00

L-BOARD - TNP2AA139ACM

IC3801	
1	6.66
2	0.00
3	2.44
4	0.00
5	4.35
6	210.80
7	21.53
8	144.50
9	0.00

IC3802	
1	6.68
2	0.00
3	2.49
4	0.00
5	4.19
6	210.80
7	21.58
8	140.40
9	0.00

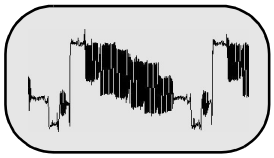
IC3803	
1	6.70
2	0.00
3	2.48
4	0.00
5	3.82
6	210.80
7	21.47
8	142.00
9	0.00

IC901	
1	1.38
2	2.97
3	0.70
4	11.69
5	0.00
6	0.00
7	0.19
8	69.00
9	69.00
10	141.00
11	141.00

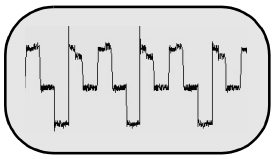
IC3802	
1	4.55
2	4.55
3	4.54
4	0.16
5	4.54
6	0.21
7	0.00
8	4.56
9	0.00
10	4.88
11	4.88
12	9.21
13	4.56
14	4.56
15	4.53
16	4.56
17	4.53
18	4.56

IC901	
1	14.61
2	14.61
3	0.30
4	0.30
5	-16.37
6	2.82
7	2.83
8	2.83
9	2.83
10	15.96

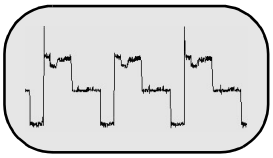
A-Board TNP2AH063



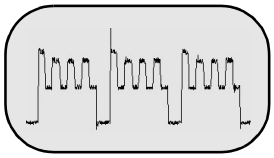
① **1.00 Vp-p**
TNR001 (MAIN VIDEO)



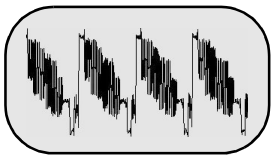
② **2.88 Vp-p**
A11 PIN 3 (RED OUT)



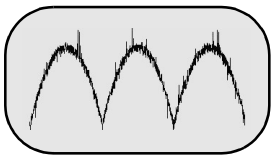
③ **2.88 Vp-p**
A11 PIN 4 (GREEN OUT)



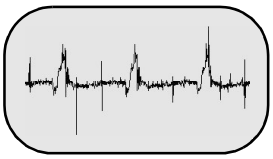
④ **2.88 Vp-p**
A11 PIN 5 (BLUE OUT)



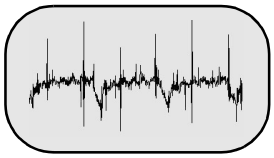
⑤ **2.06 Vp-p**
A22 PIN 17 (MAIN Y)



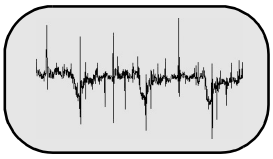
⑥ **0.80 Vp-p**
A23 PIN 1 (V-DAF)



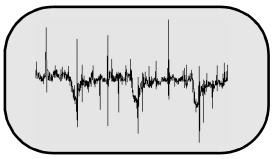
⑦ **0.37 Vp-p**
A23 PIN 2 (ABL)



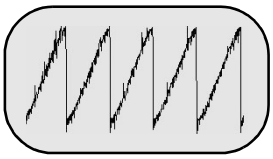
⑧ **0.15 Vp-p**
A23 PIN 3 (HHS REF)



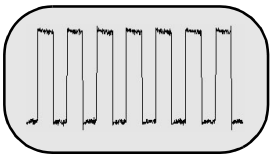
⑨ **0.12 Vp-p**
A23 PIN 7 (MOMENT BSW)



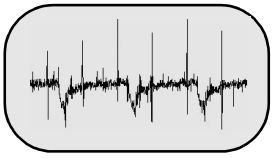
⑩ **0.13 Vp-p**
A23 PIN 10 (V_RASTER)



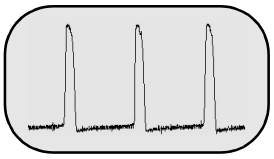
⑪ **0.86 Vp-p**
A23 PIN 13 (V_DRIVE)



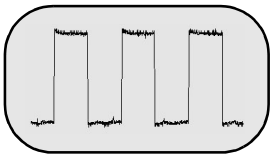
⑫ **3.36 Vp-p**
A23 PIN 30 (H_DAF)



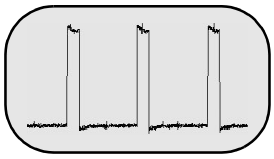
⑬ **0.11 Vp-p**
A23 PIN 29 (EHT DET)



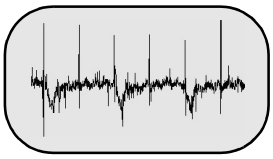
⑭ **3.8 Vp-p**
A23 PIN 28 (FBP)



⑮ **3.4 Vp-p**
A23 PIN 27 (H DRIVE)

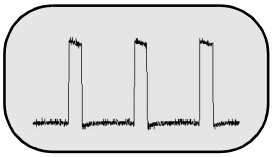


⑯ **3.4 Vp-p**
A23 PIN 26 (EW DRIVE)

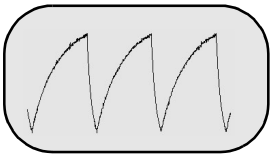


⑰ **0.11 Vp-p**
A23 PIN 25 (H RASTER)

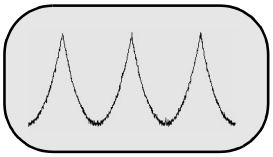
D-Board TNPH0466AG



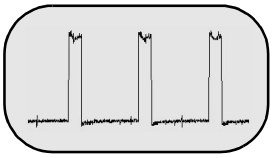
① **12.6 Vp-p**
IC751 PIN 1



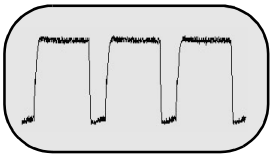
② **9.12 Vp-p**
IC751 PIN 2



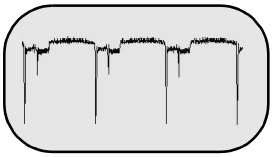
③ **5.92 Vp-p**
IC751 PIN 3



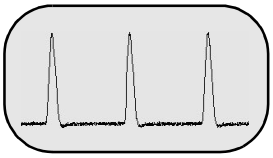
④ **3.44 Vp-p**
IC751 PIN 6



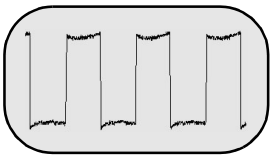
⑤ **12.4 Vp-p**
IC751 PIN 7



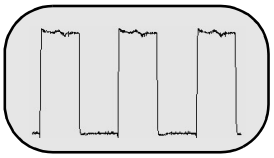
⑥ **14.0 Vp-p**
Q551-B



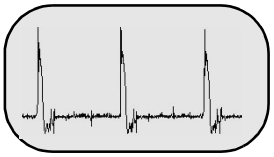
⑦ **1.56 KVp-p**
Q551-C



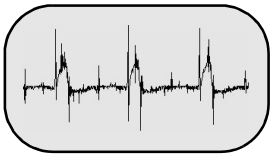
⑧ **20.4 Vp-p**
Q501-D



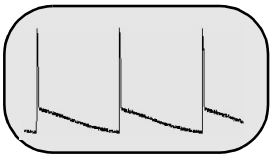
⑨ **11.5 Vp-p**
Q501-G



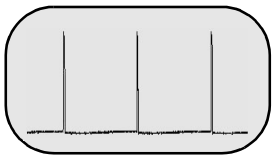
⑩ **3.4 Vp-p**
Q502-D



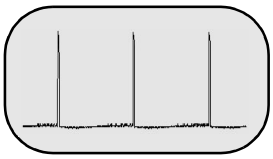
⑪ **0.82 Vp-p**
Q502-G



⑫ **84.0 Vp-p**
IC451 PIN 3



⑬ **64.8 Vp-p**
IC451 PIN 4



⑭ **31.6 Vp-p**
IC451 PIN 8